

## EGLIN AIR FORCE BASE, Florida

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### FINAL ENVIRONMENTAL ASSESSMENT

### ADVANCED LITTORAL RECONNAISSANCE TECHNOLOGIES (ALRT) PROJECT AT EGLIN AIR FORCE BASE, FLORIDA



MAY 2008

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**FINAL FINDING OF NO SIGNIFICANT IMPACT  
FOR  
ENVIRONMENTAL ASSESSMENT FOR THE ADVANCED LITTORAL RECONNAISSANCE  
TECHNOLOGIES (ALRT) PROJECT  
AT  
EGLIN AIR FORCE BASE, FLORIDA**

**RCS 07-135  
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**Introduction**

This finding and the analysis upon which it is based were prepared pursuant to the President's Council on Environmental Quality regulations for implementing the procedural provisions of the National Environmental Policy Act as put into effect by 40 Code of Federal Regulations (CFR) 1500-1508 and the United States Air Force *Environmental Impact Analysis Process* as effectuated by 32 CFR Part 989. The 46th Test Wing (TW) has conducted an Environmental Assessment (EA) of the probable environmental consequences for the Advanced Littoral Reconnaissance Technologies (ALRT) Project on Eglin Air Force Base (AFB), Florida.

**Need for Proposed Action (EA Section 1.2, page 1-4)**

Naval forces require cost-effective modular systems that can provide real-time feedback of battlefield conditions of the littoral region at all required times of the day or night and without added risk to lives or expensive assets. The ALRT program is developing technologies to enhance current capabilities and provide solutions to current tactical reconnaissance problems. The distinguishing feature of these tests would be the ability to obtain data over a set of more realistic amphibious landing zone environments (surf zone and beaches) to ascertain system performance and to aid in further minefield detection algorithm development when working in optical backgrounds of this type.

**Proposed Action (EA Section 2.1, pages 2-1 to 2-9)**

Under the Proposed Action (preferred alternative), the 46th TW would collect both passive and active multi-spectral seeker/sensor signature data of obstacles, simulated mines and barricades in inland environments and littoral waters from several possible systems and airframes. The sensors would typically consist of passive multi-spectral receivers collecting imagery just as a video camera would, but some missions would be active and have up to a Class IV laser illuminator. Simulated mines and obstacles would be set up from the shore up to 4 meters (m) in depth over a 100-meter-wide area and inert mines, barricades and obstacles would be placed on beach and inland areas.

During each one to two week testing series, multiple data collection flights would occur, typically with two flights per day. The standard airframe for these tests will be the Bell UH-1 helicopter, although other aircraft are possible. The helicopter would fly to A-15 to collect data, land at A-15 to refuel, download data and check systems. The helicopter would take off from Test Area A-15 for the second data collection flight, then land on the mainland at mission completion or choose to secure the aircraft at the test site overnight. Flights would occur during day and night hours, with approximately 25 percent of missions occurring at night between the hours of 2100 and midnight. Altitudes would range from 150 to 914 m (500 to 3,000 ft) for each sortie, with speeds from 35 to 70 knots (40 to 81 miles per hour), typically. Aircrew would fly clover leaf, racetrack and/or parallel tracks as needed to optimize data collection. Other aircraft

such as small, fixed-winged planes staged out of local airports may be used as well for future missions but these wouldn't land and refuel at A-15.

The typical system would consist of the imaging sensor, optical illuminator, image recording hardware, navigation tracking software, mechanical cooling equipment for the illuminator, and the aircraft. Lasers are enclosed in a light-tight enclosure with a mechanical shutter for stopping illumination when not over target fields. In addition, a number of laser safety devices may be incorporated into the system to prevent inadvertent laser operation (depending on severity of laser radiation). Cameras would record images of the target field. All recording is annotated electronically and synchronized together with Global Positioning System time.

Personnel would follow general precautions and procedures during system testing. All personnel that potentially could be exposed to dangerous laser radiation would be required to wear safety goggles. As for laser radiation received on the ground, some lasers such as the ALDAI-W are eye-safe at approximately 46 m (150 ft), which is well below the planned minimum altitude of 150 m (500 ft). Thus, animals and unaided personnel on the ground would be safe from any stray laser radiation. To minimize the risk of injury to stray ground personnel, the lasers would only actively radiate approximately 50 m before the target array in the water, remain active over the target fields and remain active slightly past it into the water (this would create a buffer zone of approximately 100 m [330 ft] before and after the target fields). Ground and surface personnel would clear the test area before granting permission to actively fire the laser. Personnel would have high-powered flashlights for proper safety control of the area. Ground and marine spotters would be present to support beach, Sound and Gulf range clearance. The Air Force would issue Notices to Airmen (NOTAMs) and Notices to Mariners (NOTMARs) as needed.

Obstacles would include floats and buoys, scientific instrumentation, tetrahedrons, structural hedgehogs, and concrete cubes 4 ft × 4 ft × 4 ft (1.2 m × 1.2 m × 1.2 m). Barricades would include concertina wire or wire rolls that could simulate concertina wire, tanglefoot barbed wire fencing and structural sea urchins, which are three pieces of steel rebar welded in the shape of a teepee. These targets would be placed on the beach and in the surf zone. The obstacles and barricades would be no longer than 100 m (330 ft); M20 inert anti-tank mines may be scattered around the other items but would be located within the potential placement locations. Similar barricades or obstacles may be used both in the surf zone and on the beach.

#### **Alternative Action 1 (EA Section 2.2, page 2-9)**

Alternative 1 would implement the testing described above in the Proposed Action with two notable exceptions. Concertina wire or simulated concertina wire and structural sea urchins would not be used in the water under this alternative. All other aspects of testing and systems used would remain the same as the Proposed Action.

#### **The No Action Alternative (EA Section 2.3, page 2-10)**

The No Action Alternative would involve the continuation of the current laser equipment testing program activities and would not allow for the ALRT testing to occur as described in the Proposed Action. The current target layout no longer meets the laser equipment testing needs of the program because it does not facilitate or approximate real threat scenarios. Therefore, the No Action Alternative would not meet the training needs and objectives of the Navy.

### **Affected Environment (EA Section 3, pages 3-1 to 3-30)**

The Proposed Action would potentially affect socioeconomic factors, soils and sediments, water resources, noise, biological resources, and safety and cultural resources.

### **Environmental Impacts (EA Section 4, pages 4-1 to 4-29)**

Section 4 of the EA discusses in detail potential environmental impacts to the following resources.

*Socioeconomic Factors.* The Proposed Action and Alternatives are not expected to have adverse impacts to socioeconomic factors. Potential impacts to tourism, as well as commercial and recreational, fishing and boating activities are all considered insignificant under this alternative.

*Soils and Sediments.* The Proposed Action and Alternatives would not cause adverse impacts to soils and sediments. Target field setup and removal would cause sediment disturbance; however, impacts would be temporary and localized.

*Water Resources.* The Proposed Action and Alternatives are not anticipated to result in any major negative effects to water resources. Target field setup and removal would cause turbidity; however, impacts would be minimal, temporary and localized. Target fields would not occur in wetlands or areas that drain into wetlands. Minor digging to bury mines would occur in the 100 year floodplain, but missions would be infrequent, of short duration and all holes would be refilled after mine removal.

*Noise.* The Proposed Action and Alternatives are not anticipated to result in any major negative effects from noise. Noise from setup activities and aircraft use could affect sensitive species on Santa Rosa Island (SRI); however noise from setup activities would be brief and aircraft noise would be minor compared to noise from activities at nearby Hurlburt Field.

*Biological Resources.* The Proposed Action and Alternatives would not cause adverse impacts to biological resources. Direct impacts, habitat alteration and noise impacts during setup and removal activities and during testing are possible, but the proponent would implement management actions to minimize impacts, such as silt fencing around the beach target areas and the cessation of missions if sea turtles were spotted.

*Safety.* No major negative impacts to safety are anticipated. Some of the lasers that would be used in ALRT testing would not be eye safe at low altitudes, so safety precautions would be taken. Eglin Range Safety (AAC/SEU) would issue NOTAMs and NOTMARs as necessary.

*Cultural Resources.* The Proposed Action and Alternatives would not cause adverse impacts to cultural resources. Should cultural resources be encountered during target setup or removal, all activity in the area would cease and Eglin's Cultural Resources Branch would be notified.

### **Issues Eliminated from Detailed Analysis (EA Section 1.5.1, pages 1-5 to 1-6)**

The 46th TW does not anticipate that the Proposed Action would adversely impact the following resource areas. They include: Land Use/Air Installation Compatible Use Zone, Utilities and Infrastructure, Transportation, Air Quality, Hazardous Materials and Solid Waste and Environmental Justice and Risks to Children. Therefore, these issues were not carried forward for further analysis.

### **Cumulative Impacts Analysis (EA Section 4.9, pages 4-26 to 4-29)**

The Proposed Action and Alternative Actions would not create cumulative environmental, population or health impacts. No significant cumulative effects are expected to socioeconomic factors, soils and sediments, water resources, noise, biological resources or to safety and cultural resources from the implementation of the ALRT Proposed Action and Alternatives, ongoing training activities, Base Realignment and Closure related actions, the SRI beach repair and renourishing activities.

### **Public Notice**

Public Comment will be located in EA Appendix D. The Draft EA for the ALRT Project on Eglin AFB, Florida, and the Finding of No Significant Impact were made available for public review and comment at the Fort Walton Beach Public Library and the Navarre Library. Copies were available for public review and comment from 20 September 2007 through 16 October 2007. No comments were received from the public.

### **Permits and Plans (EA Section 5.1, page 5-1)**

This project will comply with a Joint Coastal Permit (JCP) application. Through the JCP, the Environmental Permitting Section of Florida Department of Environmental Protection (FDEP) reviews permit applications to make sure that any potential adverse impacts of the proposed projects have been avoided or minimized.

Any components of the Proposed Action that take place within the jurisdictional concerns of the State would require a consistency determination with respect to Florida's Coastal Management Plan.

Eglin's Natural Resources Section (NRS) is conducting an Endangered Species Act (ESA) Section 7 Consultation with the U.S. Fish and Wildlife Service (USFWS) for potential impacts to threatened and endangered species and critical habitat. The 46th TW will comply with the management requirements of the Biological Assessment.

Eglin's NRS is also conducting an ESA Section 7 Consultation, Marine Mammal Protection Act consultation, and an Essential Fish Habitat (EFH) consultation with the National Marine Fisheries Service for potential impacts to threatened and endangered species, marine mammals and EFH. The 46th TW will comply with the requirements of each of the consultations.

### **Management Actions (EA Section 5.2, pages 5-2 to 5-4)**

The proponent is responsible for the implementation of the following management actions.

The following management actions would reduce potential impacts to water resources:

- Minimizing disturbance to bottom sediments and beach soils.
- Not establishing target fields in wetlands.
- Minimizing ground-disturbing activities in floodplains.

The ALRT program would not affect any beach restoration projects on SRI. To minimize impacts to sea turtles and other sensitive SRI species, the management actions below would be

required as part of the Proposed Action. Many of these requirements are Terms and Conditions from the *Eglin ALRT Testing Biological Opinion* (USFWS, 2004). Sea turtle season at Eglin AFB is 1 May to 31 October.

- If any portion of the ALRT testing would occur during the period from 1 May through 31 October, the (NRS) would conduct daily early morning sea turtle surveys. Nesting surveys at Test Area A-15 would begin 70 days prior to ALRT activities or by 1 May, whichever is later. Nesting surveys would continue through the end of the activities or through 1 September, whichever is earlier. After this period, the NRS would continue to check nests based on anticipated hatching dates.
- The NRS would relocate all sea turtle nests in the Test Area A-15 area to adjacent beaches at least 15 m (50 ft) from the boundaries of the test site. All nests will be relocated between Index Nesting Beach Survey marker 3.5 and 4.5 if testing is conducted during the nesting season. Nest relocations associated with the ALRT project would cease when project activities no longer threatened nests.
- During sea turtle season, personnel would install a fence (e.g., silt fence) to direct sea turtles away from the common and simulated concertina wire, structural sea urchins and tanglefoot wire on the beach and onto adjacent beaches. This silt fence would serve to minimize but not eliminate potential takes to nesting sea turtles. Section 7 consultations would determine the amount and extent of take.
- On the nights that ALRT activities would be conducted, the NRS would provide location information to test participants concerning each sea turtle nest within 0.8 km (0.5 mile) of Test Area A-15 that was at or past incubation day 60.
- Participants would avoid marked sea turtle nests by at least 15 m (50 ft).
- On the nights that ALRT activities would be conducted, the east and west boundaries of Test Area A-15 would be clearly posted, marked on the ground or provided on maps to participants.
- On the nights that ALRT activities would be conducted, one testing participant would serve as an observer to be responsible for identifying signs of nesting or hatchling sea turtles. The observer would be responsible for assuring that the project participants did not interfere with nesting sea turtles, impede hatchling sea turtles from emerging from the nest and crawling to the Gulf of Mexico or obscure signs of sea turtle activity.
- If an adult or hatchling sea turtle were observed on the beach while the ALRT testing was ongoing, testing would stop until the turtle left the beach. Participants would remain as quiet as possible allowing the turtle to continue activities. All effort would be made not to obscure the turtle crawl or nest area.
- Between 1 May and 31 October, Eglin would provide test participants the name of a 24-hour contact person who would be available to respond to emergencies related to harm or injury to sea turtles and to answer questions related to endangered species and the testing activities. Point of contact would be Bob Miller, 1-850-883-1153.
- Between 1 May and 15 November, all direct lighting of the beach and nearshore waters associated with the ALRT activities would be limited to Test Area A-15. If all sea turtle

nests have hatched or been evacuated within 0.8 km (0.5 mile), this restriction is not required.

- Between 1 May and 31 October, all setup and take-down activity associated with ALRT testing on the beach and in the surf zone would occur during daytime hours and after the morning sea turtle survey is completed.
- Participants would receive conditions and restrictions to the ALRT activities.
- Eglin would provide an educational overview for the ALRT participants in the form of a handbook.
- No equipment or vehicle use would occur on or within dune habitat.
- No project participants would traverse dunes, vegetated or unvegetated, that are 1.5 m (5 ft) tall or taller.
- If habitat restoration is necessary, it would be designed and conducted to minimize impacts to sea turtles in accordance with FDEP guidelines detailed in the *ALRT Biological Opinion Terms and Conditions*.

The following management actions would reduce potential impacts resulting from safety concerns:

- All personnel would wear laser goggles if required for unsafe illumination levels.
- Lasers would only actively radiate directly over the target field, including a 30 m (98 ft) buffer zone around the target field.
- Ground and surface personnel would clear the test area before granting permission to actively fire the laser.
- Ground and marine spotters would be used to continuously support beach, sound, highway, and Gulf range clearance.
- NOTAMs and NOTMARs would be issued prior to any test activities.
- In the event of a hurricane or named storm event, maximum effort would be made to remove all barricades, obstacles and mines in both the water and on the beach prior to storm landfall.
- The proponent would do a thorough inventory control sweep of the area during and after the project so no shapes would be orphaned and left in the field.
- AAC/SEU will host a Hazard Review Board and an Airborne Test Review and Safety Board to address the Safety aspects of airborne laser operations to the civilian community and ensure the safety of the test engineers and their support crews. Ground and Marine spots will be used to continuously support beach, sound, highway and Gulf range clearance.

The following management actions would reduce potential impacts to cultural resources:

- The U.S. Army Corps of Engineers and construction contractors would avoid archaeological sites. Eglin AFB Cultural Resources would construct or place barriers such as fences or marking sites in the field and on maps to identify areas to avoid.
- When avoidance of sites is not feasible, the Cultural Resources Branch and the Florida State Historic Preservation Officer would employ alternative means (for example, data recovery) to reduce or eliminate the potential for impact to cultural resources.
- Areas where artifacts can be seen on the surface of the ground would be avoided. Artifacts include any man-made object, including glass, nails, bricks, ceramics, arrowheads, metal and structures such as fence posts and building remnants.
- Digging, construction, vehicular traffic or other ground-disturbing activities in the direct vicinity of historic properties listed, eligible or potentially eligible for listing on the National Register of Historic Places would be avoided. If digging, vehicular traffic or other ground-disturbing activities are to occur in such an area, workmen would notify Eglin AFB Cultural Resources staff, who would clearly mark or identify those areas listed as eligible or potentially eligible.

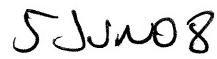
#### **FINDING OF NO SIGNIFICANT IMPACT**

Based on my review of the facts and the environmental analysis contained in the attached EA and as summarized above, I find the proposed decision of the 46th TW to develop the ALRT Project on Eglin AFB, Florida would not have a significant impact on the human or natural environment; therefore, an environmental impact statement is not required. This analysis fulfills the requirements of the National Environmental Policy Act, the President's Council on Environmental Quality and 32 CFR Part 989.

Signature



DENNIS D. YATES, Colonel, USAF  
Commander, 96th Civil Engineer Group



Date

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**FINAL  
ENVIRONMENTAL ASSESSMENT**

**ADVANCED LITTORAL  
RECONNAISSANCE TECHNOLOGIES  
(ALRT) PROJECT AT  
EGLIN AIR FORCE BASE, FLORIDA**

Submitted to:

**96<sup>th</sup> Civil Engineer Group  
Environmental Management Division  
96 CEG/CEV  
Eglin AFB, FL 32542**

**MAY 2008**



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## ACRONYMS, ABBREVIATIONS, AND SYMBOLS

<b>46<sup>th</sup> TW</b>	46 <sup>th</sup> Test Wing
<b>96 CEG/CEVH</b>	96 <sup>th</sup> Civil Engineer Group/Environmental Management Division/Cultural Resources Branch
<b>96 CEG/CEVSN</b>	96 <sup>th</sup> Civil Engineer Group/Environmental Management Division/Stewardship Branch/ Natural Resources Section
<b>96 CEG/CEVSP</b>	96 <sup>th</sup> Civil Engineer Group/Environmental Management Division/Stewardship Branch/Environmental Analysis Section
<b>AFB</b>	Air Force Base
<b>AFI</b>	Air Force Instruction
<b>ALDAI-W</b>	Airborne Laser Diode Array Illuminator - Wide
<b>ALRT</b>	Advanced Littoral Reconnaissance Technologies
<b>ANSI</b>	American National Standards Institute
<b>ARG/MEU</b>	Amphibious Ready Group/Marine Expeditionary Unit
<b>ASEL</b>	Average Sound Exposure Level
<b>BOMARC</b>	Boeing and Michigan Aeronautical Research Center
<b>C<sub>E</sub></b>	Correction Factor
<b>CEQ</b>	Council on Environmental Quality
<b>CFR</b>	Code of Federal Regulations
<b>cm</b>	Centimeters
<b>CWA</b>	Clean Water Act
<b>CZMA</b>	Coastal Zone Management Act
<b>dB</b>	Decibels
<b>dBA</b>	A-weighted Decibels
<b>dB<sub>P</sub></b>	Peak Unweighted Decibels
<b>DOI</b>	Department of Interior
<b>EA</b>	Environmental Assessment
<b>EBR</b>	Eglin Beach Resources
<b>EEZ</b>	Exclusive Economic Zone
<b>EFH</b>	Essential Fish Habitat
<b>EGTTR</b>	Eglin Gulf Test and Training Range
<b>EO</b>	Executive Order
<b>ESA</b>	Endangered Species Act
<b>FAC</b>	Florida Administrative Code
<b>FDEP</b>	Florida Department of Environmental Protection
<b>FHRA</b>	Florida Historical Resources Act
<b>ft</b>	Feet
<b>ft<sup>2</sup></b>	Square Feet
<b>FWC</b>	Florida Fish and Wildlife Conservation Commission
<b>GIWW</b>	Gulf Intracoastal Waterway
<b>GPS</b>	Global Positioning System
<b>HD</b>	Hazard Distance
<b>HLZ</b>	Helicopter Landing Zone
<b>Hz</b>	Hertz
<b>IWR</b>	Impaired Waters Rule
<b>J/cm<sup>2</sup></b>	Joules per Square Centimeter
<b>JCP</b>	Joint Coastal Permit
<b>kHz</b>	Kilohertz
<b>km<sup>2</sup></b>	Square kilometers
<b>kts</b>	Knots
<b>LIDAR</b>	Light Detection and Ranging System
<b>μs</b>	Microseconds
<b>m</b>	Meters
<b>mm</b>	Millimeters
<b>MMPA</b>	Marine Mammal Protection Act
<b>MPE</b>	Maximum Permissible Exposure

## LIST OF ACRONYMS, ABBREVIATIONS, AND SYMBOLS, CONT'D

<b>Nd:YAG</b>	Neodymium-doped Yttrium Aluminum Garnet
<b>Nd:YAG OPO</b>	Neodymium-doped Yttrium Aluminum Garnet with Optical Parametric Oscillator Module
<b>NEPA</b>	National Environmental Protection Act
<b>NHPA</b>	National Historic Preservation Act
<b>nm</b>	Nanometers
<b>NM</b>	Nautical Mile
<b>NMFS</b>	National Marine Fisheries Service
<b>NOAA</b>	National Oceanic and Atmospheric Administration
<b>NOHD</b>	Nominal Ocular Hazard Distance
<b>NOTAM</b>	Notice to Airmen
<b>NOTMAR</b>	Notice to Mariners
<b>NPDES</b>	National Pollutant Discharge Elimination System
<b>NRHP</b>	National Register of Historic Places
<b>NRS</b>	Natural Resources Section
<b>ns</b>	Nanoseconds
<b>PDM</b>	A type of mine
<b>psi</b>	Pounds per Square Inch
<b>ROAR</b>	Rapid Overt Airborne Reconnaissance
<b>SAIC</b>	Science Applications International Corporation
<b>SHPO</b>	State Historic Preservation Officer
<b>SRI</b>	Santa Rosa Island
<b>SSC</b>	State Species of Concern
<b>u</b>	Attenuation Coefficient
<b>U.S.</b>	United States
<b>USACE</b>	U.S. Army Corps of Engineers
<b>USEPA</b>	U.S. Environmental Protection Act
<b>USFWS</b>	U.S. Fish and Wildlife Service

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## 1. PURPOSE AND NEED FOR ACTION

### 1.1 PROPOSED ACTION

The Proposed Action would involve the collection of both passive and active multi-spectral seeker/sensor signature data of obstacles, simulated mines and barricades in inland environments, and littoral waters from several possible systems and airframes. In this document *obstacles* are defined as objects placed in the water or on the beach that still allow marine animals complete access to and from the shore. These items can be (but not limited to) PDM-1 and PDM-2 inert mines, hedgehogs, tetrahedrons, and concrete cubes. Barricades are items that would interfere with access to and from the beach. These items typically are 50 – 100 meters (m) (164 – 328 feet [ft]) long and can be (but not limited to) concertina wire, tangle foot, and the sea urchins (obstacles placed so close together that they act as a barricade).

Tests would occur at Test Area A-15 on the Eglin Air Force Base (AFB) portion of Santa Rosa Island (SRI). Eglin AFB occupies 1,875 square kilometers ( $\text{km}^2$ ) (724 square miles [ $\text{mi}^2$ ]) of land area in the northwest Florida panhandle, east of Pensacola (Figure 1-1). The Eglin Military Complex includes SRI, which is located in the southern section of Eglin AFB in Okaloosa and Santa Rosa Counties, Florida (Figure 1-2). SRI is a narrow barrier island approximately 80 kilometers (km) (50 miles [mi]) long and less than 0.8 km (0.5 mi) wide, separated from mainland northwest Florida to the north by Santa Rosa Sound (a shallow lagoon varying in width from 122 m (400 ft) to nearly 1,524 m (5,000 ft) and Choctawhatchee Bay (United States [U.S.] Air Force, 2005).

The Advanced Littoral Reconnaissance Technologies (ALRT) project at Naval Surface Warfare Center – Panama City plans to test various active sensors and passive sensors combined with laser illuminators. The laser illuminators would consist of varying types of lasers including Nd:YAG/Nd:YLF (neodymium-doped yttrium aluminum garnet/yttrium lithium fluoride), Nd:YAG/Nd:YLF OPO (neodymium-doped yttrium aluminum garnet/yttrium lithium fluoride with Optical Parametric Oscillator module) shifted, laser diode array illuminators, all of various wavelengths, and other experimental sensors and/or illuminators for future systems. The various sensors would consist of both narrow and wide fields of view and be flown in an aircraft usually 150 m (500 ft) to 914 m (3,000 ft) above the targets. The ALRT team would utilize three areas of Test Area A-15: the Gulf coastal beach area (out to 4-m [13-ft] depths), the Sound (out to 4-m [13-ft] depths), and an intermediate area between the two coastal areas. To create a realistic threat scenario, the target area would include inert mines, obstacles, and barricades on the island and in the water. Personnel would install the targets at Test Area A-15 over a three- to four-day period in a fashion to simulate actual mine layouts. After installation, mission flights would commence, during which a sensor system would be flown over the targets. While over the targets, the passive sensors would collect data and any laser subsystems would scan the target fields both over water and land. Testing could occur at any time of the year, day or night. Upon test completion, personnel would remove targets from the test site over a two- to three-day period. The mines and obstacles would be on the beach and in the water for no longer than an estimated two weeks per test event.

Purpose and Need for Action

*Proposed Action*

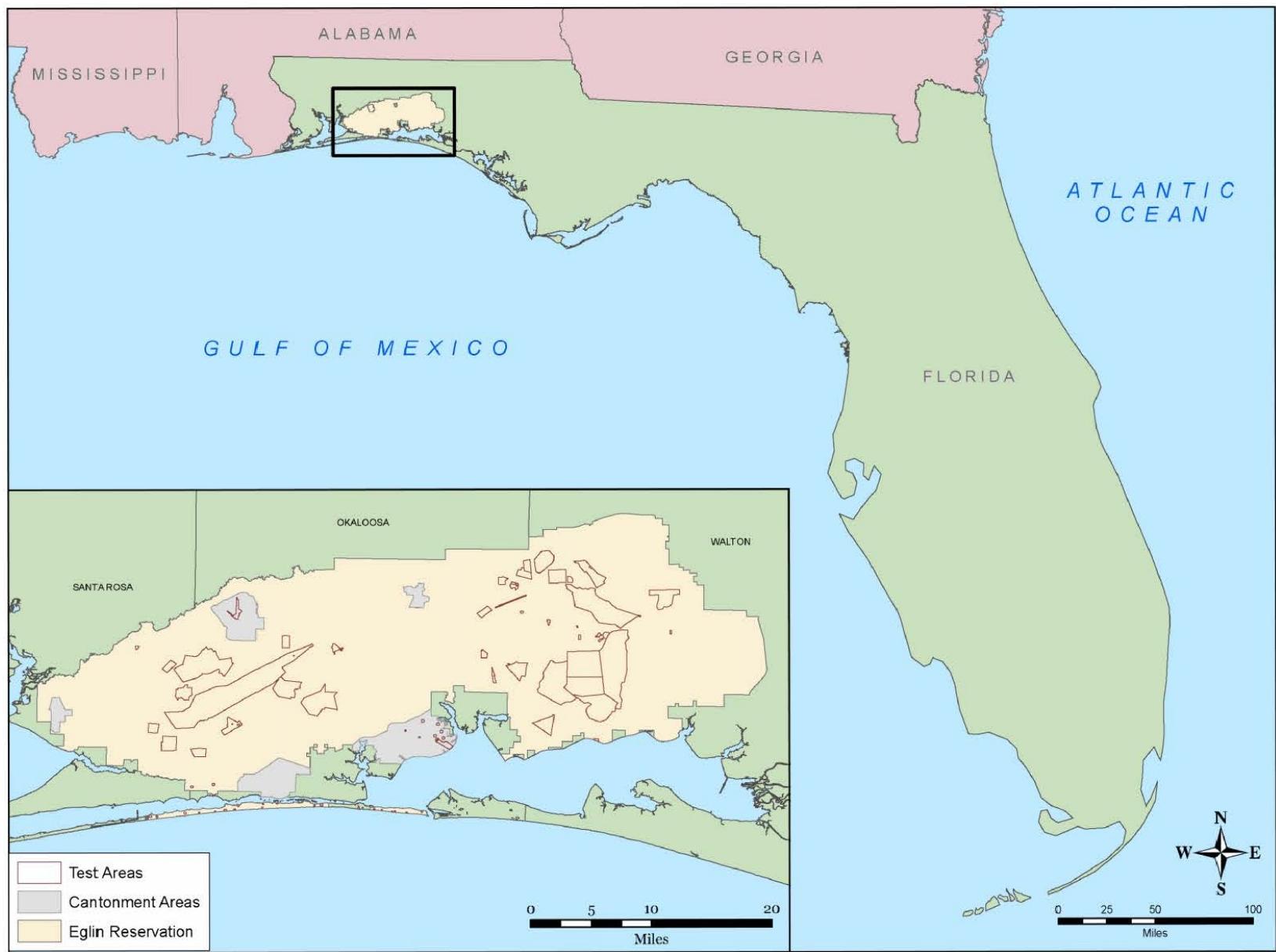


Figure 1-1. Regional Location of Eglin AFB

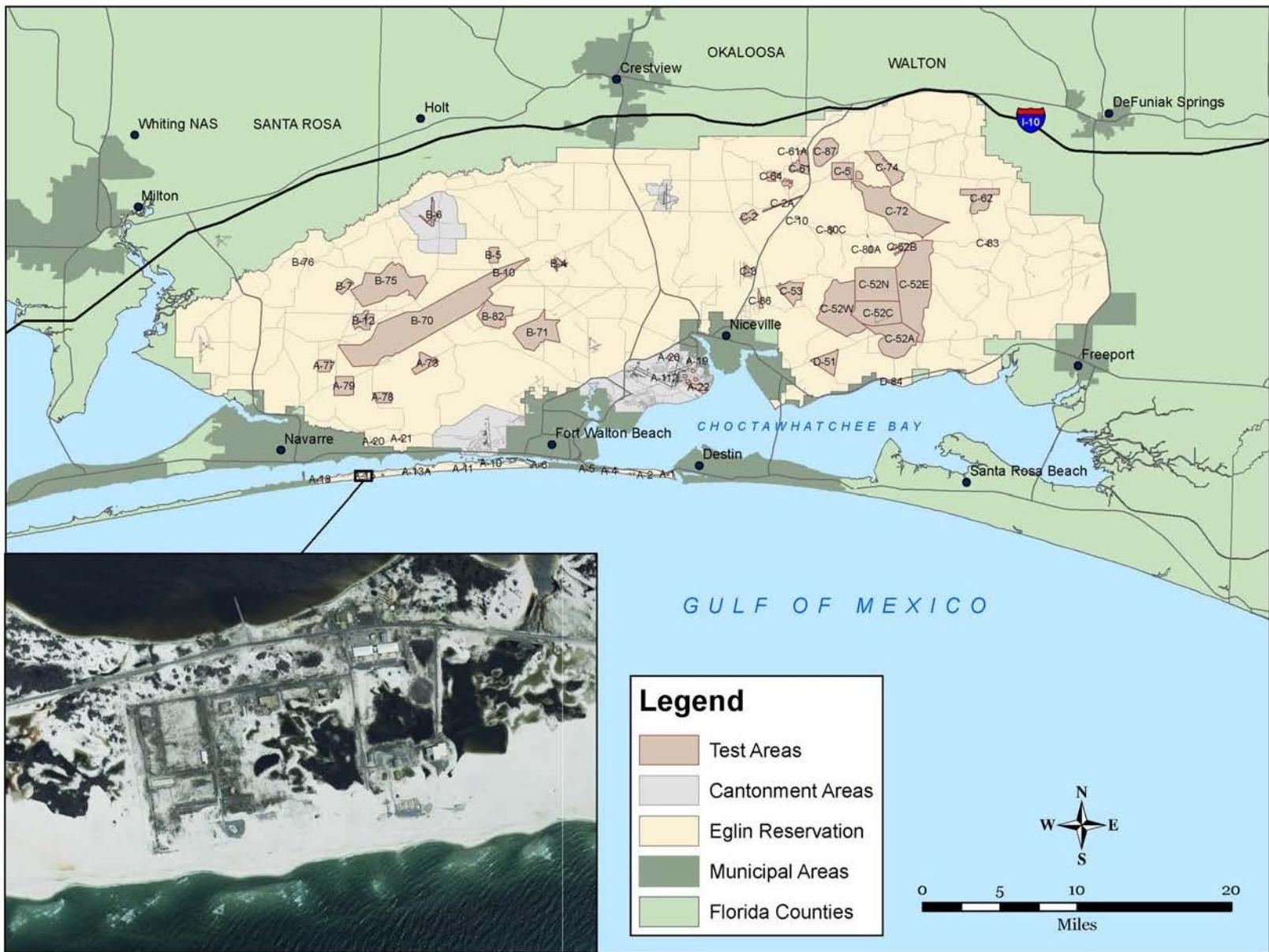


Figure 1-2. Test Area A-15 on Santa Rosa Island

## 1.2 NEED FOR PROPOSED ACTION

Naval forces require cost-effective modular systems that can provide real-time feedback of battlefield conditions of the littoral region at all required times of the day or night and without added risk to lives or expensive assets. The ALRT program is developing technologies to enhance current Naval Mine Countermeasures capabilities and provide solutions to current tactical reconnaissance problems. The distinguishing feature of these tests would be the ability to obtain data over a set of more realistic amphibious landing zone environments (surf zone and beaches) to ascertain system performance and to aid in further minefield detection algorithm development when working in optical backgrounds of this type.

Past and current ALRT mission include flying missions over target fields utilizing three areas of Test Area A-15: the Gulf coast beach area, the bay-side coastal area, and an intermediate area between the two coastal areas. Targets include M20 anti-tank mines and PDM-1M anti-tank/anti-landing craft mines. Targets are placed in the surf zone with the first row at approximately 0.61 – 0.91 m (2 – 3 ft) deep during a mean high tide. Obstacles are placed on the surface around the minefields (not in the water). Concertina (razor) wire is placed along the beach and would stretch between 50 – 100 m (164 – 328 ft) at approximately 0.91 to 1.22 m (3 to 4 ft) wide. The current target layout no longer meets the program testing requirements because it does not represent or approximate real threat scenarios and as a result, does not meet the training needs and objectives of the Navy.

## 1.3 OBJECTIVE OF THE PROPOSED ACTION

The test objective of the proposed action is to collect imagery over mine-like objects, obstacles, and barricade targets in a realistic environment on the beach, in the sound, and in the surf zone to characterize algorithm/system performance and provide data for feedback on future system design.

## 1.4 RELATED ENVIRONMENTAL DOCUMENTS

Test sites on SRI have supported a number of similar activities in the past involving placement of inert mines in the waters of the Gulf of Mexico, surfzone, and beaches. The majority of these projects were categorically excluded from further National Environmental Protection Act (NEPA) analysis due to historic and/or similar analyses. Due to new species and critical habitat designation, a categorical exclusion was not applicable for some new ALRT missions. The following related projects have occurred on and around Santa Rosa Island.

- Airborne Littoral Reconnaissance Technologies Project, Eglin AFB, FL, Formal U.S. Fish and Wildlife Service (USFWS) Endangered Species Act (ESA) Section 7 Consultation (U.S. Air Force, 2004)
- Eglin AFB Airborne Littoral Reconnaissance Technologies Testing Biological Opinion (USFWS, 2004)
- Santa Rosa Island Mission Utilization Plan Programmatic Environmental Assessment (U.S. Air Force, 2005a)

- Santa Rosa Island Mission Utilization Plan Programmatic Biological Assessment (U.S. Air Force, 2005b)
- Santa Rosa Island Mission Utilization Plan Biological Opinion (USFWS, 2005).
- Integrated Natural Resources Management Plan 2007-2011, Eglin AFB, FL (U.S. Air Force, 2007)
- Estuarine and Riverine Programmatic Environmental Assessment, Eglin AFB, FL (U.S. Air Force, 2003)

## **1.5 SCOPE OF ENVIRONMENTAL ASSESSMENT**

This document was prepared in accordance with the requirements of NEPA of 1969, the Council on Environmental Quality (CEQ) regulations of 1978, and 32 Code of Federal Regulations (CFR) Part 989. To initiate the environmental analysis, the 46<sup>th</sup> Test Wing submitted an Air Force Form 813, Request for Environmental Impact Analysis, to the 96 Civil Engineer Group/Environmental Management Division, Stewardship Branch, Environmental Analysis Section (96 CEG/CEVSP). The 96 CEG/CEVSP reviewed the Air Force Form 813 and determined that an environmental assessment (EA) (this document) was required. This EA considers the effects from the Proposed Action (Preferred Alternative) Alternative 1, and a No Action Alternative.

### **1.5.1 Issues Eliminated from Detailed Assessment**

Based on the scope of the Proposed Action and alternatives and a preliminary analysis, the following issues were eliminated from further analysis.

#### **Air Quality**

ALRT missions would result in only a minuscule increase in flight hours compared to the normal flight load of Eglin AFB, thus was not analyzed further.

#### **Hazardous Materials and Solid Waste**

There is no potential for impacts from hazardous materials or waste. The Proposed Action would not involve the storage or creation of hazardous materials. All mines and obstacles placed on the beach and in the water would be removed at mission completion. No Environmental Restoration Program sites or Areas of Concern would be affected by the Proposed Action.

#### **Land Use**

No change to surrounding land use or to current Air Installation Compatibility Use Zones would occur, thus land use was not analyzed.

#### **Transportation**

No public roads exist in the Test Area A-15 area; therefore, impacts to transportation were not analyzed.

## **Utilities**

The Proposed Action would not directly impact any utilities or increase consumption of any resources served by the utilities; therefore, utilities were not analyzed.

## **Environmental Justice and Risks to Children**

Environmental Justice and Risks to Children concerns were eliminated as a potential issue. Effects of the Proposed Action would be limited to the Test Area A-15 area and would not disproportionately affect minorities, low-income persons, or children in the surrounding community.

### **1.5.2 Issues Studied in Detail**

Preliminary analysis based on the scope of the Proposed Action identified the following potential environmental issues warranting additional detailed analysis.

#### **Soils/Sediments**

Placement and removal of mines, barriers, and obstacles on land and in the water, especially during the jetting used to place some of the obstacles or barricades, would disturb bottom sediments and potentially terrestrial soils.

#### **Water Resources**

Placement and removal of mines, barriers, and obstacles in the water, may require water jetting. This excavation process would disturb bottom sediments, thereby causing an increase in turbidity.

Activities would be avoided in wetlands and areas that drain into wetlands. Areas devoid of wetland vegetation present the most suitable environments for the ALRT mission. As a result, forested areas, herbaceous wetlands, and sea grass beds would be avoided. An Eglin Natural Resources biologist would be onsite during initial object deployment to confirm that the project is outside of any wetland area. Minor digging to bury mines (5 to 10 centimeters [cm], or 2 to 4 inches) would occur within the 100-year floodplain, but missions would be infrequent (four per year) and of short duration (one to two weeks), and all holes would be refilled after mine removal by rakes or other similar means.

#### **Noise**

Noise from aircraft use and setup activities has the potential to affect biological resources near Test Area A-15. Noise from aircraft use over 152 m (500 ft) would be negligible due to the constant air traffic over the area in the East-West Flight Corridor; however, noise from helicopter landings and take-offs at the Test Area A-15 helicopter landing zone (HLZ) may impact wildlife. Species potentially affected include the piping plover, sea turtles, the beach mouse, and shorebirds.

## Biological Resources

The Proposed Action may impact biological resources from direct impacts, habitat alteration, and noise impacts during setup and removal activities, and during testing. The deterrence of potential entanglement hazards to sea turtles would be of primary concern.

## Socioeconomic Resources

ALRT activities may require the closure of certain waters during testing. These closures may interfere with access to certain fishing areas and may result in socioeconomic impacts.

## Safety

Some of the sensors used in ALRT testing would contain lasers that may not be “eye safe” to humans from missions flown at low altitudes. To minimize the risk of injury to ground personnel, lasers would only actively radiate over the target fields. Ground and surface personnel would clear the test area before granting permission to actively fire the laser. Ground and marine spotters would be present to support beach, sound, highway, and Gulf range clearance. Eglin would issue Notices to Airmen (NOTAMs) and Notices to Mariners (NOTMARs). All personnel would wear laser goggles as needed, and as is already required for low-altitude operations.

The potential for Bird-Aircraft Strike Hazard (BASH) is insignificant. Only one mishap involving the any of the possible airframes for this test has occurred in the last 10 years, and no damage was suffered to the helicopter during the incident (Daniel, 2007). Therefore BASH has been eliminated as a safety issue and will not be discussed further in this document.

## Cultural Resources

Due to the potential for cultural resources at Test Area A-15 on the beach and in the water, informal consultation with the State Historic Preservation Officer (SHPO) occurred. The SHPO was made aware of the undertaking during an informal discussion in Eglin’s Cultural Resources office and agrees that a formal consultation would not be necessary. The SHPO will have an opportunity to comment and address any concerns that they may have during the clearinghouse review.

## 1.6 APPLICABLE REGULATORY REQUIREMENTS AND COORDINATION

- The 46<sup>th</sup> Test Wing (46<sup>th</sup> TW) is submitting an application for a Joint Coastal Permit (JCP) to the Florida Department of Environmental Protection (FDEP) and U.S. Army Corps of Engineers (USACE). The JCP is presented in Appendix A of this document. The 46<sup>th</sup> TW will comply with the management requirements of the JCP when approved.
- In addition to the JCP, a separate Coastal Zone Management Act (CZMA) Determination would be required. Any components of the Proposed Action that take place within the jurisdictional concerns of the State would require a consistency determination with respect to Florida’s Coastal Management Plan (Appendix E).

- The 46<sup>th</sup> TW is conducting an Endangered Species Act (ESA) Section 7 consultation with the USFWS for potential impacts to threatened and endangered species and critical habitat. The 46<sup>th</sup> TW will comply with the management requirements of the Biological Assessment (Appendix B1), and the Terms and Conditions of the Biological Opinion (Appendix B2).
- The 46<sup>th</sup> TW is conducting an ESA Section 7 consultation, Marine Mammal Protection Act (MMPA) consultation, and an Essential Fish Habitat (EFH) consultation with the National Marine Fisheries Service (NMFS) for potential impacts to threatened and endangered species, marine mammals, and EFH (Appendix C). The 46<sup>th</sup> TW will comply with the requirements of each of the NMFS consultations.
- Eglin's Cultural Resources office conducted an informal consultation with the SHPO for potential impacts to cultural resources. Any other comments from the State clearinghouse will be provided in Appendix D.

## **1.7 DOCUMENT ORGANIZATION**

This EA follows the organization established by the CEQ regulations (40 CFR, Parts 1500–1508). This document consists of the following chapters.

1. Purpose and Need for Action
2. Description of Proposed Action and Alternatives
3. Affected Environment
4. Environmental Consequences and Cumulative Impacts
5. Plans, Permits, and Management Actions
6. List of Preparers
7. References

APPENDIX A      Joint Coastal Permit (FDEP and USACE)

APPENDIX B      ESA Section 7 Consultation with USFWS (Biological Assessment and Biological Opinion)

APPENDIX C      ESA Section 7, Marine Mammal Protection Act, and EFH Consultations with NMFS

APPENDIX D      Public and State Agency Comments

APPENDIX E      Coastal Zone Management Act (CZMA) Determination

## 2. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

As required by federal regulations, this EA addresses the possible environmental impacts of the Proposed Action, Alternative 1, and a No Action Alternative. Section 2.4 summarizes the issues and potential impacts associated with the Proposed Action and alternatives.

### 2.1 PROPOSED ACTION

Under the Proposed Action (Preferred Alternative), the ALRT project would collect signature data from both passive and active multi-spectral seeker/sensor signature data of obstacles, simulated mines, and barricades in inland environments and littoral waters from several possible systems and airframes. The sensors would typically consist of passive multi-spectral receivers collecting imagery just as a video camera would, but some missions would be active and have up to a Class IV laser illuminator. Simulated mines, barriers, and obstacles would be set up on beach and inland areas as well as a separate specified marine area extending from the shore up to 4 m (13 ft) in depth over a 100 m (328 ft) wide area.

System and flight descriptions, target field items, and management actions of the Proposed Action are discussed in detail in this section.

#### System and Flight Descriptions

During each one to two week testing series, multiple data collection flights would occur, typically with two flights per day. The aircraft, a Bell UH-1 “Huey”, the standard airframe for this test, would fly to Test Area A-15 to collect data. Then, the aircraft would land on Test Area A-15 to refuel, download data, check systems, and tie down for the night as required. The Test Area A-15 Fire Department would support all helicopter landing, stationing, and refueling operations. The HLZ would be marked and static line equipped. The helicopter would take off from Test Area A-15 for subsequent data collection flight, then return to the mainland or stay on Test Area A-15 at mission completion. Flights would occur during day and night hours, with approximately 25 percent of missions occurring at night between the hours of 2100 and midnight. Altitudes would range from 152 to 914 m (500 to 3,000 ft) for each sortie, with speeds from 35 to 70 knots (40 to 81 miles per hour) typically. Aircrew would fly clover leaf, racetrack, and/or parallel tracks as needed to optimize data collection.

Other aircraft such as small fixed-winged planes may be used as well for future missions—these planes would not refuel at Test Area A-15. Missions that do not require landing at Test Area A-15 would stage out of local airports.

Test Area A-15 is shown in Figure 2-1.

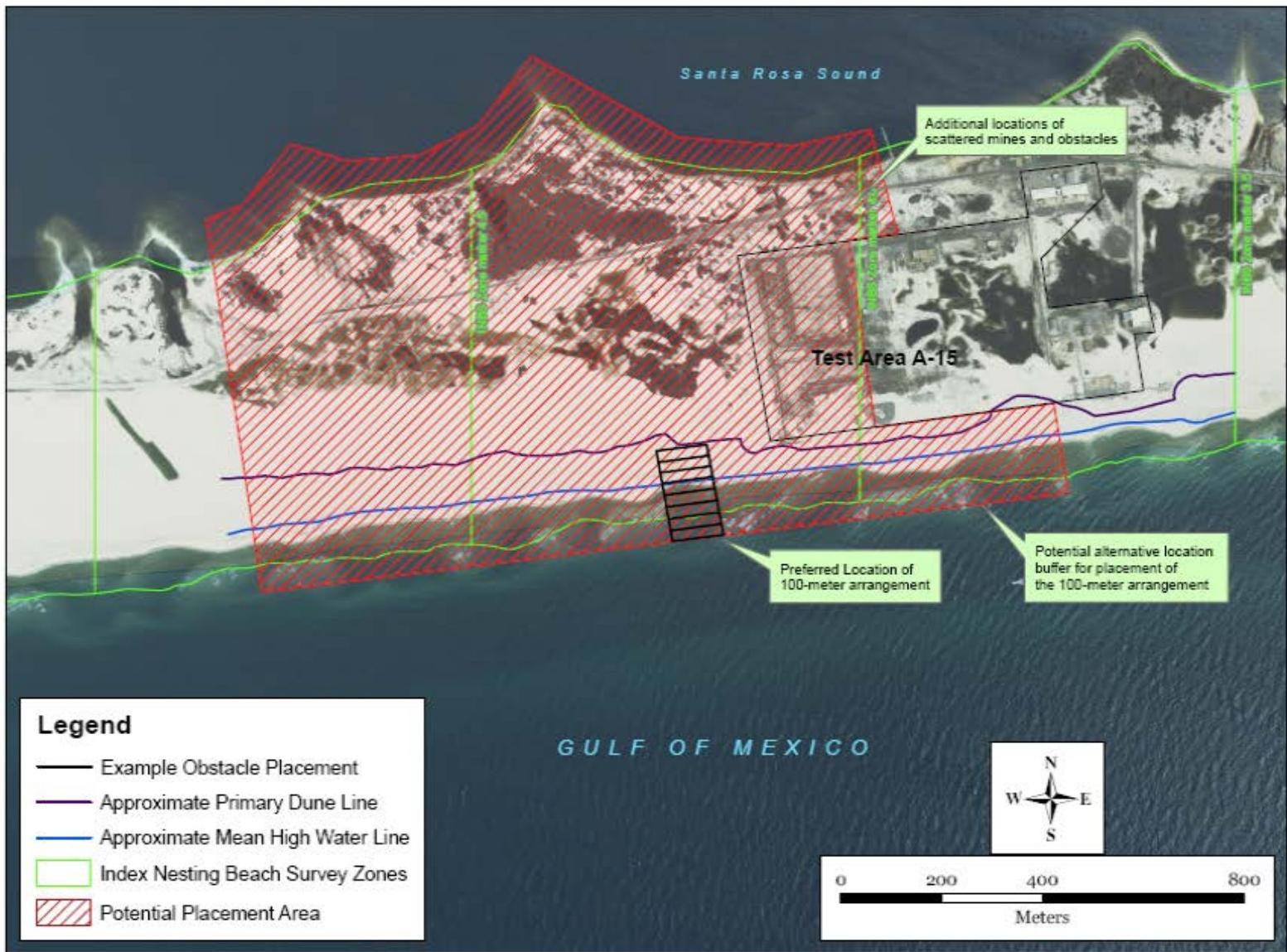


Figure 2-1. ALRT Target Areas at Test Area A-15

The typical system would consist of the imaging sensor, optical illuminator, image recording hardware, navigation tracking software, mechanical cooling equipment for the illuminator, control electronic and power supplies, and the aircraft. Lasers are enclosed in a light-tight enclosure with a mechanical shutter for stopping illumination when not over target fields. In addition, a number of laser safety devices may be incorporated into the system to prevent inadvertent laser operation (as required based on illumination levels). Cameras would record images of the target field. All recording is annotated electronically and synchronized together with Global Positioning System (GPS) time. Illuminator examples are shown in Tables 2-1 and 2-2. Airborne Laser Diode Array Illuminator - Wide (ALDAI-W) and Rapid Overt Airborne Reconnaissance (ROAR) laser parameters and hazard levels are included in Tables 2-1 to 2-4.

Personnel would follow general precautions and procedures during system testing. All personnel that potentially could be exposed to the laser at unsafe levels would be required to wear safety goggles. As for laser radiation received on the ground, the ALDAI-W is eye-safe at approximately 46 m (150 ft), which is well above the planned minimum altitude of 152 m (500 ft). Thus, animals and unaided personnel on the ground would be safe from any stray laser radiation. However, if any personnel were to view the ALDAI-W radiation with optical aids (such as binoculars), they would be well within the Nominal Ocular Hazard Distance (NOHD) of the ALDAI-W (Table 2-2).

**Table 2-1. ALDAI-W Laser Parameters**

Item	Value
Wavelength	808 nm
Power	0.47 Joules/Pulse
Pulse Width	200 $\mu$ s
Pulse Repetition Frequency	30 Hz
Beam Diameter in Horizontal Direction	3.0 cm (1.18 in) (half power point)
Beam Diameter in Vertical Direction	4.5 cm (1.77 in) (half power point)
Beam Divergence in Horizontal Direction	0.2985 radians (half power point)
Beam Divergence in Vertical Direction	0.1152 radians (half power point)
Gains of Aided Device	49 (Standard Binoculars)
Attenuation Coefficient (u)	$5.0 \times 10^{-7} \text{ cm}^{-1}$ (Very Clear Day)

ALDAI-W=Airborne Laser Diode Array Illuminator – Wide; nm=nanometer; cm=centimeter; u=Attenuation coefficient;  $\mu$ s=microsecond

**Table 2-2. ALDAI-W Laser Hazards**

Item	Value
Optical Density of Eyewear (unaided)	4.76 @ 808 nm
Optical Density of Eyewear (aided)	6.46 @ 808 nm
NOHD (unaided, u=0)	47.8 m (156.8 ft)
NOHD (aided, u=0)	335 m (1,099.1 ft)
HD (skin hazard)	0.08 m (3.15 inches)

ALDAI-W=Airborne Laser Diode Array Illuminator – Wide; nm=nanometer; m=meters; u=Attenuation coefficient; HD= Hazard Distance; NOHD=Nominal Ocular Hazard Distance

**Table 2-3. ROAR Laser Parameters**

Item	Land Value			Marine Value		
Wavelength (nm)	523	690	790	523	250	523
Power (mJoules/pulse)	500	150	150		250	
Pulse Width (ns)	3.5			3.5		
Pulse Repetition Frequency (Hz)	16.67			16.67		
Beam Diameter in X Direction (mm)	25			25		
Beam Diameter in Y Direction (mm)	25			25		
Beam Divergence in X Direction (mradians)	45			45	15	
Beam Divergence in Y Direction (mradians)	45			45	15	

ROAR=Rapid Overt Airborne Reconnaissance; nm=nanometer; Hz=Hertz; mm=millimeter

**Table 2-4. ROAR Laser Hazards**

Item	Land Value			Marine Value	
	523 nm	690 nm	790 nm	523 nm	
	45 mradians			15 mradians	45 mradians
Optical Density of Eyewear (unaided)	2.64	2.11	1.93	2.81	2.81
NOHD (unaided, u=0) (m)	272	149	187	217	644
HD (skin hazard) (m)	1.30	0.60	0.30	1.70	5.00

nm = nanometers; NOHD = Nominal Ocular Hazard Distance; u = Attenuation coefficient; m = meter; HD = Hazard Distance

The ROAR laser as used on land is eye-safe at 271.5 m (890.5 ft), with a planned mission minimum altitude of 310 m (1,016.8 ft). For ROAR laser use over the marine environment, the eye-safe distance is 643.74 m (2,112.3 ft) (Table 2-4).

To minimize the risk of injury to stray ground personnel, the lasers would only actively radiate approximately 50 m before the target array in the water, remain active over the target fields and remain active slightly past it into the water (this would create a buffer zone of approximately 100 m [328 ft] before and after the target fields) (Figure 2-1). Ground and surface personnel would clear the test area before granting permission to actively fire the laser. Personnel would have high-powered flashlights for proper safety control of the area. Ground and marine spotters would be present to support beach, Sound, and Gulf range clearance. The Air Force would issue NOTAMs and NOTMARs. All personnel would wear laser goggles as required.

The aircrew engineer and pilot would have communication with ground operations and Eglin AFB at all times. Any test personnel could call for a laser shutdown, and the pilot and backseat engineer both would have a master shutdown switch. The aircrew engineer would only operate the laser while crossing areas within or immediately adjacent to the target areas. A dual mode indicator validates laser operation.

### Target Field

Test Area A-15 would provide an ideal background for obtaining imagery over sandy coastal terrain approximating a real threat scenario. In keeping with the program requirements to

detect minefields in the littoral zone, the ALRT team would utilize three areas of Test Area A-15: the Gulf coast beach area, the Sound, and an intermediate area between the two coastal areas (Figure 2-1). Targets would also be placed in the waters of the Gulf (in particular the surf zone area) and Sound (out to 4 m [13 ft] depths).

***Test Duration***

Each test series would last one to two weeks. Personnel would set up the target field over three to four days, the mission flights would commence, and then personnel would remove the targets from the test site over two to three days. ALRT missions could occur every few months; the current estimate is four to five times per year.

A typical mission scenario would be described as:

- Three to four days – target set up and mission preparation;
- Four to six days – conduct mission flights;
- Two to four days – weather backup; and,
- Two to three days – target removal and clean up (inland area targets may be left in place longer or for multiple missions if it results in less impact than repeated removal and setup).

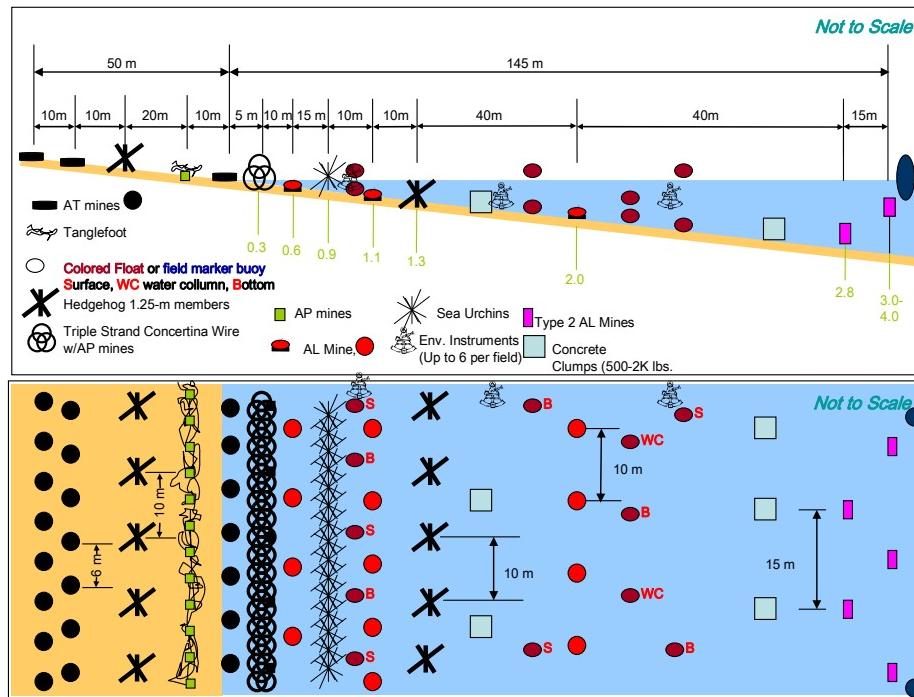
Notice to Mariners (NOTMARS) would be broadcast to the general public during and after set-up. Either reflective or lighted buoys would be placed approximately 50 m [164 ft] away from the perimeter of the array notifying boats of restricted access to area. During the test mission a Naval/Air Force boat would be present in the water to intercept and warn other boats approaching the test area. There have been no reported such boat incursions during the previous testing regimes.

***Minefield Barrier and Obstacle Layouts***

Activities associated with testing include placement of inert mines and obstacles (such as concrete blocks and concertina wire) on the beach front. M20 anti-tank mines, PDM-1M anti-tank/anti-landing craft mines, or other similar mines that are approximately 14 inches in diameter plus baseplate accessories as required, would be used in the surfzone at 0.5-m (1.64-ft) depths.

The minefield, barrier, and obstacle layouts required for this test include linear patterned and random scattered mines, barriers, and obstacles on the beach and in the water. Figure 2-2 illustrates the proposed tactical in-water minefield, barrier, and obstacle layout. Personnel would place inert mines in each area to simulate actual mine layouts in accordance with current available doctrine. To minimize the movement or loss of mines, each individual target would be anchored, tied together, inventoried, and monitored for proper set-up. These devices would be

positioned near the edge of the water or in the water up to 4 m (13 ft) deep and anchored primarily with screw anchors or occasionally poles jetted into the sand. To raise and lower some of the heavier targets, a boat/barge with equipment would be necessary. A scuba diver would then secure each mine with a screw anchor.



**Figure 2-2. Proposed Action ALRT Target Field Layout**

Mine positions would be recorded using a hand-held Differential GPS system at the time of installation in the target field. Personnel would record this “truth data” on the minefield layout chart and use it to score the actual data results to determine horizontal location accuracy. For reference, areas of Test Site A-15 to be flown over would be marked on the perimeter with  $1.22 \text{ m}^2$  (4 square feet [ $\text{ft}^2$ ]) painted aluminum panels and/or small lights (pointed up). These panels and lights would remain in place throughout the flight series. For night operations, strobe lights would be set up to direct the flight paths accordingly.

The inert mines would include M20 inert anti-tank, PDM-1M inert anti-landing craft, and PDM-2 inert anti-landing mines (Figures 2-3 through 2-5). These mine targets are representative of the different materials and types of anti-tank mines encountered in littoral scenarios and are readily available from the current Navy project inventory. They would also provide a representative sampling of the sizes and spectral signatures encountered in real-world scenarios. Obstacles would include floats and buoys, scientific instrumentation, tetrahedrons, structural hedgehogs, and concrete cubes  $4 \text{ ft} \times 4 \text{ ft} \times 4 \text{ ft}$  ( $1.2 \text{ m} \times 1.2 \text{ m} \times 1.2 \text{ m}$ ) (Figure 2-6). Barricades would include concertina wire or wire rolls that could simulate concertina wire (Figure 2-7), tanglefoot barbed wire fencing, and structural Sea Urchins, which are three pieces of steel rebar welded in the shape of a teepee (Figure 2-8).



**Figure 2-3. M20 Inert Anti-Tank Mines**



**Figure 2-4. PDM-1M  
Anti-Landing  
Craft Mines**



**Figure 2-5. PDM-2M Inert Mine**



**Figure 2-6. Structural Hedgehog and Concrete Cubes**

**Figure 2-7. Simulated Concertina Wire****Figure 2-8. Structural Sea Urchins Wrapped in Fence**

These targets would be placed on the beach and in the surf zone. The obstacles and barricades would not be longer than 100 m (328 ft); however, M20 inert Anti-Tank mines may be scattered around the other items but would be located within the potential placement locations (Figure 2-1). Similar barricades or obstacles may be used both in the surf zone and on the beach. A number of other mine target rows and scattered fields will be placed within the defined test area at various locations on the dry beach; however, the entire test area would never be totally filled—only various small sections of the total area would have typical minefield layouts at any given time.

There would not be more items emplaced than current inventory allotments allow. Those inventories consist of up to 1,000 mine-like objects varying in size from a few inches up to 36 inches in diameter and other targets such as buoys varying in size up to 36 inches, marker panels typically 4 ft x 4 ft, various wire obstacles, various light to medium anti-landing obstacles, and various instrumentation for monitoring the environment. After the objects are put into place, positional surveys are conducted. For in-water objects, a hand held GPS is used to locate the objects by either walking into the water or using a kayak to float out. Also, divers check the

targets daily to verify that the objects are there and clean them off. During these daily checks, divers will survey the area for protected marine species in the area.

Certain mines, obstacles, and barricades have previously been approved for use at SRI for other missions. The Proposed Action would expand on the list of approved items that are provided in detail below.

- Floats and lights to mark the boundary of the test field area and floats throughout the target field area to serve as additional targets.
- Water quality measurement instrumentation positioned on a tall screw anchor (four total).
- Type 2 inert anti-landing craft mines at 2-m to 3-m (6.6-ft to 9.8-ft) depths and 15 m (49.2 ft) apart.
- Structural hedgehogs (1 m x 1 m x 1 m [3.3 ft x 3.3 ft x 3.3 ft]) in approximately 1.3-m (4.3-ft) depth with 10-m (32.8-ft) spacing.
- Structural sea urchins (2 m [6.6 ft] tall) in 0.9-m (2.95 ft) depth and 100 m (328 ft) long.
- Concertina wire or wire rolls manufactured to simulate concertina wire in .3 m (1 ft) of water and 100 m (328 ft) long.
- Additional anti-landing craft mines in the water, in particular at 0.6-m (2-ft), 1.1-m (3.6-ft), and 2-m (6.5-ft) depths at 6 to 10 m (19.7 to 32.8 ft) apart.
- A 100 m (328 ft) tangle-foot barbed wire array 10 m (32.8 ft) from the water edge.
- Additional row of 1 m x 1 m x 1 m (3.3 ft x 3.3 ft x 3.3 ft) structural hedgehogs 30 m (98.4 ft) from the water edge.
- Row of anti-tank mines buried in the sand by hand.
- A trailer on the beach to capture data from devices located in the water that collect water clarity information. These devices would be positioned around the edge of the target field and would need to be anchored to screw anchors or to poles jetted into the sand in up to 3 m (9.8 ft) deep water.

The array would remain in place at night, with reflective buoys marking the area to keep boat traffic out. As soon as the last flight test is complete, personnel would remove all of the mines, obstacles, and barricades and account for their locations.

## **2.2 ALTERNATIVE 1**

Alternative 1 would implement the testing described above in the Proposed Action with two notable exceptions. Concertina wire or simulated concertina wire and structural sea urchins would not be used in the water under this alternative (Figure 2-9). All other aspects of testing, and systems used would remain the same as the Proposed Action.

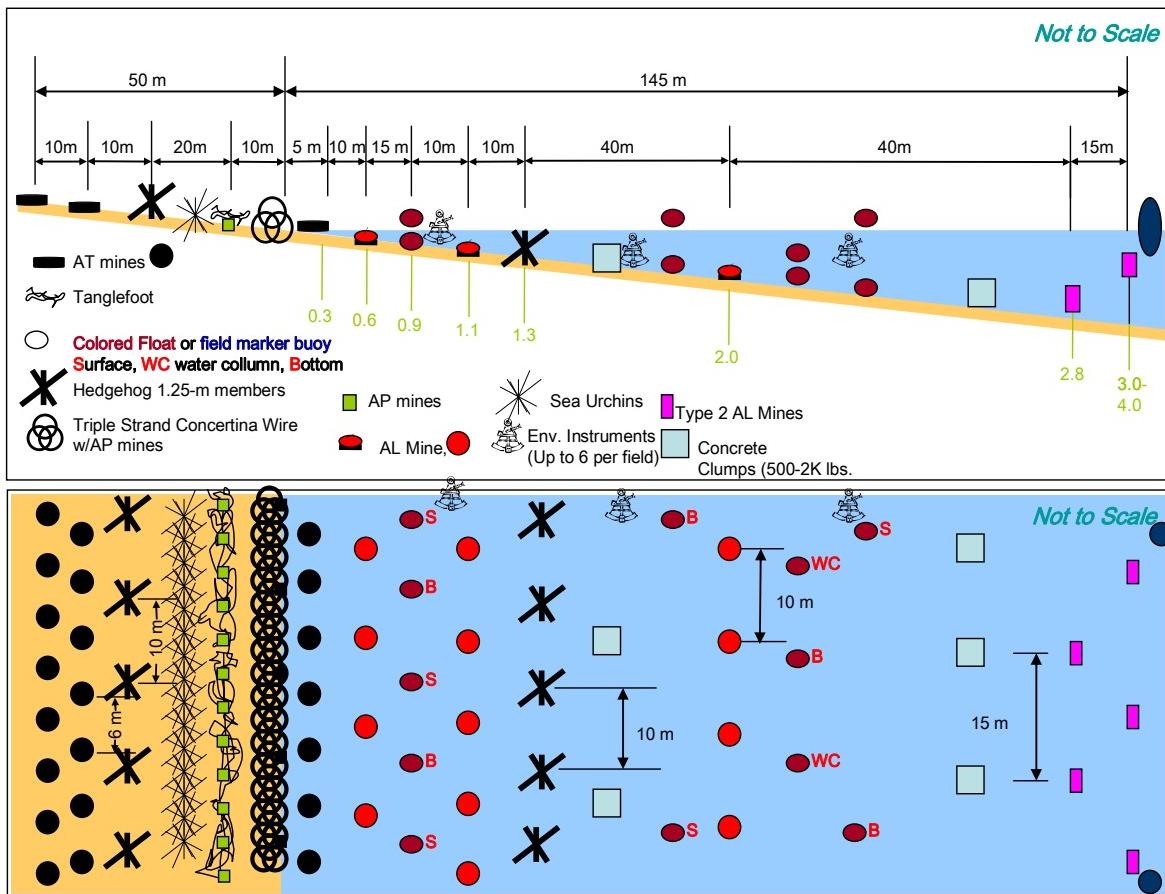


Figure 2-9. Alternative 1 ALRT Target Field Layout

## 2.3 NO ACTION ALTERNATIVE

The No Action Alternative would involve the continuation of the current laser equipment testing program activities, and would not allow for the ALRT testing to occur as described in the Proposed Action. The current target layout no longer meets the laser equipment testing needs of the program because it does not facilitate or approximate real threat scenarios. Therefore, the No Action Alternative would not meet the training needs and objectives of the Navy.

## 2.4 COMPARISON OF ALTERNATIVES

Table 2-5 provides a comparison of alternatives.

**Table 2-5. Summary of Issues, Proposed Action and Alternatives, and Potential Impacts**

Resource Area	Proposed Action (Preferred Alternative)	Alternative 1	No Action Alternative
Soils/Sediment	No major negative impacts to soils/sediments are anticipated. Target field setup and removal would cause sediment disturbance; however, impacts would be temporary and localized.	Same as Proposed Action.	Same as Proposed Action.
Water Resources	The proposed action is not anticipated to result in any major negative impacts to water resources. Target field setup and removal would cause turbidity; however impacts would be temporary and localized. Target fields would not occur in wetlands or areas that drain into wetlands. Minor digging to bury mines (5-10 cm [2-4 inches]) would occur in the 100-year floodplain, but missions would be infrequent (four per year), of short duration (1-2 weeks) and all holes would be refilled after mine removal.	Same as Proposed Action.	Same as Proposed Action.
Noise	No major negative impacts from noise are anticipated. Noise from setup activities and aircraft use could affect sensitive species on SRI; however noise from setup activities would be brief and aircraft noise would be minor compared to noise from activities at nearby Hurlburt Field. Additionally, setup activities would occur only during daylight hours to avoid impacts to sea turtles, and any night missions would stop if a sea turtle was spotted in the area.	Same as Proposed Action.	Same as Proposed Action.
Biological Resources	Direct impacts, habitat alteration, and noise impacts during setup and removal activities, and during testing are possible, but the proponent would implement management actions to minimize impacts, such as silt fencing around the beach target areas and the cessation of missions if sea turtles were spotted. The Proposed Action may negatively affect sea turtles, in particular with regard to possible entanglement and deterrence of sea turtles in the structural sea urchins or concertina wire or simulated wire rolls, thus consultations with the USFWS and NMFS would be required	No major negative impacts to biological resources are anticipated from Alternative 1. Direct impacts, habitat alteration, and noise impacts during setup and removal activities, and during testing are possible, but the proponent would implement management actions to minimize impacts, such as silt fencing around the beach target areas and the cessation of missions if sea turtles were spotted.	No biological resources issues would arise for this alternative since it has already been cleared for current ALRT testing.

**Table 2-5. Summary of Issues, Proposed Action and Alternatives, and Potential Impacts, Cont'd**

Resource Area	Proposed Action (Preferred Alternative)	Alternative 1	No Action Alternative
Socioeconomic Resources	The Proposed action is not anticipated to cause any major negative impacts to socioeconomic resources. ALRT activities would require the closure of certain waters during testing, which might interfere with access to certain fishing areas; however, closures would only last for 1-2 weeks and other fishing waters are available nearby.	Same as Proposed Action.	Same as Proposed Action.
Safety	No major negative impacts to safety are anticipated. Some of the lasers that would be used in ALRT testing would not be eye safe at low altitudes, so safety precautions would be taken, such as having the lasers only actively radiate over the target fields, personnel would wear laser goggles, and the area would be cleared before the laser was fired. Eglin would issue NOTAMs and NOTMARs.	Same as Proposed Action.	Potential impacts would be less than those for the Proposed Action because the currently approved laser is eye safe at the minimum altitude that is being flown.
Cultural Resources	Due to the potential for cultural resources at the Test Area A-15 area on the beach and in the water, an informal consultation with the SHPO was conducted and a formal consultation is not necessary. The SHPO will have an opportunity to comment and address any concerns that they may have during the clearinghouse review.	Same as Proposed Action.	No cultural resources issues would occur for this alternative since it has already been cleared for current ALRT testing.

SHPO= State Historic Preservation Officer; SRI=Santa Rosa Island; USFWS=United States Fish and Wildlife Service; NMFS=National Marine Fisheries Service; ALRT=Advanced Littoral Reconnaissance Technologies; NOTAM=Notice to Airmen; NOTMAR=Notice to Mariners

### 3. AFFECTED ENVIRONMENT

#### 3.1 SOILS

##### 3.1.1 Definition of the Affected Resource

Soil and sediment resources include the potentially affected soils and sediments within the project area. A description of landforms, soil types and characteristics, transport mechanisms, and topography is provided.

##### 3.1.2 Existing Condition

SRI is a barrier island complex, having the typical landforms of beaches, coastal dunes, interior dunes, and low-lying sound side beaches and marshes (NOAA, 2007). Gulf beaches vary in width, and are relatively flat with gentle slopes. Beach sands vary from unsorted, mixed-grain sizes and shells at the surf zone to finely graded and well-sorted grains on dunes.

Coastal dunes roughly parallel the Gulf beach. They exist in a high-energy environment of wind and wave activity and, because of this, are continually changing. Coastal dunes consist of primary dunes, closer to shore and subject to the greatest wind and wave forces, and behind these, more stable secondary dunes. Sands from primary dunes are periodically eroded and redeposited during times of high- and low-energy wave action. The exposure to salt, waves and wind limit the vegetation found on primary dunes (NOAA, 2007).

SRI's sandy landscapes are dynamic environments that are subject to drastic changes in physical condition, community structure, and ecosystem functioning. The destructive forces of wind and water associated with tropical storms and hurricanes consistently destroy and rebuild the island's morphology and ecosystems. Due to recent storms, SRI has experienced a decrease in overall land mass.

As a result of Hurricane Ivan (September 2004), Tropical Storm Arlene (June 2005), Hurricane Dennis (July 2005), and Hurricane Katrina (August 2005), many test areas have been severely eroded with varying degrees of damage to facilities and their foundations. Test areas, which were located more than 91 m (100 yards from the mean high water mark in 1995, are now in many locations only yards away from the mean high water mark. The utility waterline between Test Area A-15 (Bio Lab, Marine Operations, Urban Assault Training, Admin, and Fire Department) was damaged, and recently repaired. Hurricane Dennis partially or completely damaged 15.77 out of 22.53 km (9.8 out of 14 mi) of road on the SRI Range Complex.

The soil series identified as occurring within the proposed SRI project area is Newhan-Corolla Complex. This complex is fine sand with a depth of 0 to 2 m (0 to 80 inches). Slopes within this soil type tend to be rolling to severe with a range from 0 to 10 percent and a rapid permeability of 0.5 m (20 inches) or less per hour (Weeks et al., 1980; Overing and Watts, 1989).

Generally, the sandy soils of SRI are loose and uncoated throughout their profile, particularly the Newhan-Corolla Complex soils. Coating of sand grains by materials such as organic matter or iron/aluminum oxides can form cemented sand layers or hardpans that tend to restrict soil permeability and root penetration (i.e., spodic soils). Based on U.S. Department of Agriculture, Natural Resources Conservation Service soil survey data for the proposed project area (Weeks et al., 1980; Overing and Watts, 1989), naturally occurring spodic horizons are not anticipated subsurface features of SRI soils.

## Marine Sediments

The Gulf bottom off the shore of SRI is characterized by soft sediments (Gulf Base, 2007). The area within 1.6 km (1 mi) of shore is relatively flat and sandy with no apparent rock, coral, or limestone outcrops. The sand and sediments are of uniform consistency.

## 3.2 WATER RESOURCES

### 3.2.1 Definition of the Affected Resource

Water resources include surface water, groundwater, wetlands, and floodplains. This section describes the qualitative and quantitative characteristics of water resources. The affected environment for water resources includes the areas within the boundaries of the proposed ALRT target fields at Test Area A-15 on SRI and the wetlands and Gulf areas to which the target fields drain or flow.

### Surface Waters and Groundwater

Surface water resources include lakes, rivers, streams, bays, sounds, and oceans and are important for a variety of reasons, including economic, ecological, recreational, and human health. Groundwater includes the subsurface hydrologic resources of the physical environment. Its properties are often described in terms of the depth to the aquifer or water table, water quality, and surrounding geologic composition. Under the Clean Water Act (CWA), it is illegal to discharge pollutants from a point source into any surface water without a National Pollutant Discharge Elimination System (NPDES) permit. The USEPA has the authority to set standards for the quality of wastewater discharges. The goal of the CWA, Section 402, is the “restoration and maintenance of the chemical, physical and biological integrity of the Nation’s waters.” The state of Florida implements and enforces the provisions of the CWA, while the USEPA retains oversight responsibilities.

The state of Florida has developed and retains jurisdiction for surface water quality standards for all waters of the state in accordance with the provisions of the CWA. Section 303 of the CWA requires the state to establish water quality standards for waterways, identify those that fail to meet the standards, and take action to clean up these waterways. Florida recently adopted the Impaired Waters Rule (IWR) (Florida Administrative Code [FAC] Chapter 62-303), with amendments, as the new methodology for assessing the state’s waters for 303(d) listing. The FDEP submits names of surface waters that are determined to be impaired, using the methodology in the IWR and adopted by secretarial order, to the USEPA for approval as

Florida's 303(d) list. The FDEP submits updates to Florida's 303(d) List of Impaired Surface Waters to the USEPA every two years. The 2006 Integrated Water Quality Assessment for Florida: 2006 305(b) Report and 303(d) List Update (FDEP, 2006) satisfies the listing and reporting requirements of Sections 303(d) and 305(b) of the CWA.

## **Wetlands and Floodplains**

Wetlands are areas of transition between terrestrial and aquatic systems where the water table is usually at or near the surface or where the land is covered by shallow water (Mitsch, 2000). Abiotic and biotic environmental factors such as morphology, hydrology, water chemistry, soil characteristics, and vegetation contribute to the diversity of wetland community types. The term *wetlands* describe marshes, swamps, bogs, and similar areas. Local hydrology and soil saturation largely affect soil formation and development, as well as the plant and animal communities found in wetland areas (USEPA, 1995). Wetlands are often categorized by water patterns (the frequency or duration of flooding) and location in relation to upland areas and water bodies. Wetland hydrology is considered one of the most important factors in establishing and maintaining wetland processes and is critical to the groundwater recharge, floodwater storage, nutrient cycling, and wildlife habitat functions of wetland systems.

Section 404 of the CWA established a program to regulate the discharge of dredged and fill material into waters of the United States, including wetlands. Activities in waters of the United States that are regulated under this program include fills for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports), and conversion of wetlands to uplands for farming and forestry. The USACE is the lead agency in protecting wetland resources. This agency maintains jurisdiction over federal wetlands (33 CFR 328.3) under Section 404 of the CWA (30 CFR 320-330) and Section 10 of the Rivers and Harbors Act (30 CFR 329). The USEPA assists the USACE (in an administrative capacity) in the protection of wetlands (40 CFR 225.1 to 233.71). Furthermore, Executive Order (EO) 11990, *Protection of Wetlands*, requires federal agencies, including the Air Force, to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. In addition, the USFWS and the NMFS provide support with important advisory roles. The FDEP's Chapter 62-312, Dredge and Fill Program, affords regulatory protection to wetland resources at the state level. This agency issues a Section 401 certification under the authority of the CWA (40 CFR 230.10[b]).

Floodplains are defined by EO 11988, Floodplain Management, as "the lowland and relatively flat areas adjoining inland and coastal waters including flood-prone areas of offshore islands, including at a minimum, the area subject to a one percent or greater chance of flooding in any given year" (that area inundated by a 100-year flood). Floodplains and riparian habitat are biologically unique and highly diverse ecosystems providing a rich variety of aquatic and terrestrial species. Floodplain vegetation promotes bank stability and provides shade to moderate water temperatures. Vegetation and soil act as water filters, intercepting surface water runoff before it reaches lakes, streams, or rivers and storing floodwaters. This filtration process aids in the removal of excess nutrients, pollutants, and sediments from the water and helps reduce the need for costly cleanups and sediment removal. Floodplains also reduce downstream

flooding by increasing upstream storage in wetlands, sloughs, back channels, side channels, and former channels.

### **3.2.2 Existing Condition**

#### **Groundwater**

The two aquifers located under Eglin are the Sand and Gravel Aquifer and the Floridan Aquifer. Eglin uses only a small amount of water from the Sand and Gravel Aquifer, but the Floridan Aquifer is used extensively. The Floridan Aquifer is located below the Sand and Gravel Aquifer and extends beneath peninsular Florida.

The Sand and Gravel Aquifer consists of the Citronelle Formation and marine terrace deposits. Although the aquifer is composed of clean, fine-to-coarse sand and gravel, locally it contains some silt, silty clay, and peat beds. The Sand and Gravel Aquifer is segregated from the underlying limestone of the Floridan Aquifer by the Pensacola Clay confining bed. Water in the Sand and Gravel Aquifer exists in generally unconfined (a free water surface or water table) and confined (under pressure) conditions (U.S. Air Force, 2003). The quality of water in the aquifer has been rated good (i.e., meets its intended use) by FDEP (U.S. Air Force, 1995). Water from this aquifer is not a primary source of domestic or public supply water on Eglin because of the large quantities of higher quality water available from the underlying Upper Limestone of the Floridan Aquifer (Overing et al., 1995).

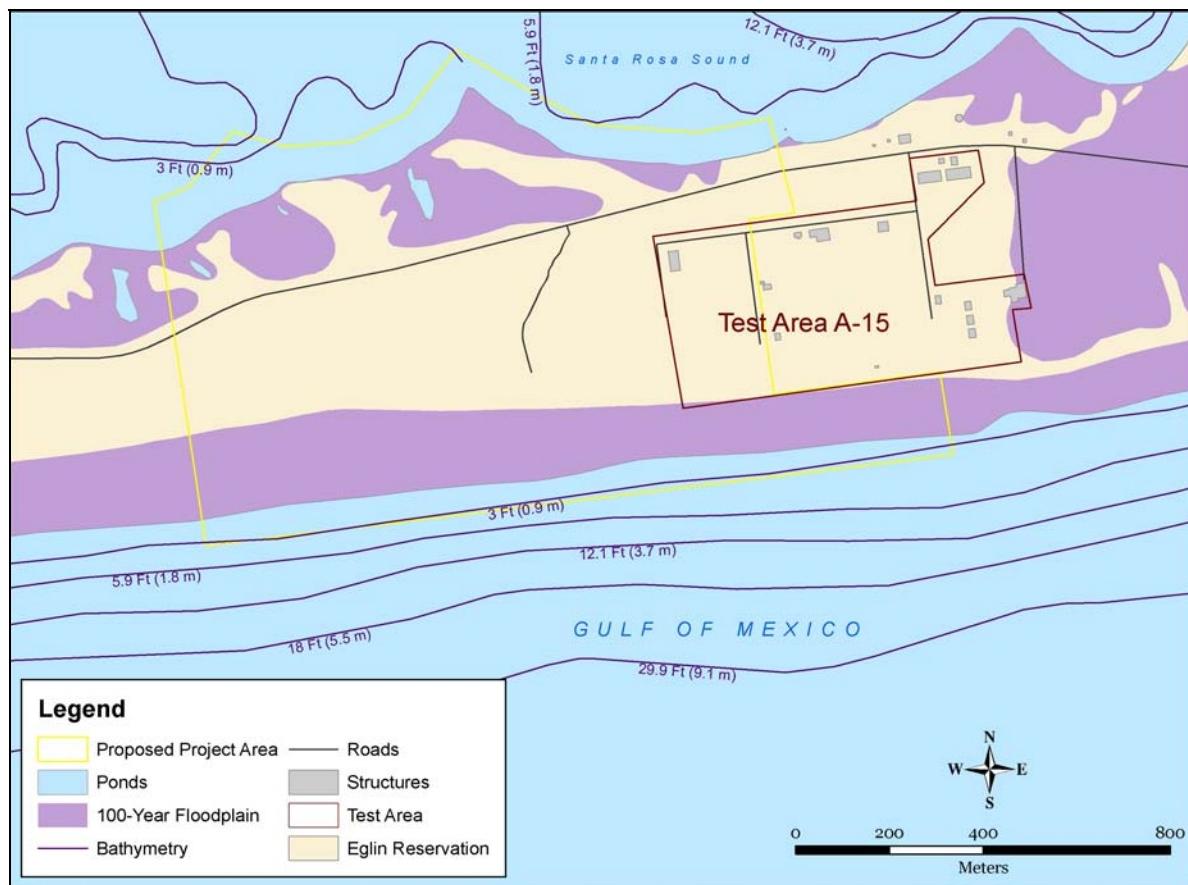
The Floridan Aquifer consists of a thick sequence of interbedded limestone and dolomite. Throughout the Eglin Reservation, the Floridan Aquifer exists under confined conditions, bounded above and below by the Pensacola Clay Formation confining bed. This clay layer restricts the downward migration of pollutants and restricts saline water from Choctawhatchee Bay and the Gulf of Mexico from entering the upper limestone layer of the aquifer. The clay layer of the Bucatunna Formation separates the upper and lower limestone units. Since this layer has a high saline content, the lower limestone unit is not used as a water source (Overing et al., 1995). Groundwater storage and movement in the upper limestone layer occurs in interconnected, intergranular pore spaces, small solution fissures, and larger solution channels and cavities. The wells on Eglin tap into both the Sand and Gravel and Floridan Aquifers and are used for both potable and nonpotable supply.

#### **Surface Water**

No defined streams exist on SRI; however, there are small tidal drains and wetlands. At the Test Area A-15 portion of SRI, Santa Rosa Sound is located to the north and the Gulf of Mexico is located to the south.

#### **Wetlands and Floodplains**

Small wetlands are scattered across SRI, some of them at and near Test Area A-15. Some portions of the Test Area A-15 area are considered floodplains (Figure 3-1).



**Figure 3-1. Water Features Within and Around Project Area**

### 3.3 NOISE

#### 3.3.1 Definition of the Affected Resource

Noise is sound that interferes with normal activities or that otherwise diminishes the quality of the environment. It may be intermittent or continuous, steady or impulsive, stationary or transient. Stationary sources are normally related to specific land uses (for example, a factory). Transient noise sources move through the environment, either along relatively established paths (for example, highways and railroads) or randomly. Responses to noise vary widely, not only according to the type of noise and the characteristics of the sound source but also according to the sensitivity of the receptor (a person or animal), the time of day, and the distance between the noise source and the receptor.

The physical characteristics of noise, or sound, include its intensity, frequency, and duration. Sound is created by acoustic energy, which produces minute pressure waves that travel through a medium, like air, and are sensed by the ear drum. As the acoustic energy increases, the intensity or amplitude of these pressure waves increase and the ear senses louder noise. The unit used to measure the intensity of sound is the decibel (dB). Sound intensity varies widely (from a soft whisper to a jet engine) and is measured on a logarithmic scale to accommodate this wide range.

The frequency of sound is measured in cycles per second, or hertz (Hz). This measurement reflects the number of times per second the air vibrates from the acoustic energy. Low-frequency sounds include thunder and explosions. High-frequency sound examples include whistles, birds chirping, and sonar pings. Sound measurement is further refined through the use of “A-weighting.” The normal human ear can detect sounds that range in frequency from about 20 Hz to 15,000 Hz. However, all sounds throughout this range are not heard equally well. Therefore, through internal electronic circuitry, some sound meters are calibrated to emphasize frequencies in the 1,000- to 4,000-Hz range. The human ear is most sensitive to frequencies in this range and sounds measured with these instruments are termed “A-weighted” and are expressed in terms of A-weighted decibels (dBA). The duration of a noise event and the number of times it occurs are also important considerations in assessing noise impacts.

The noise environment is made up of existing natural sounds and man-made or anthropogenic sounds that are strong enough to be audible above the natural background noise. Natural sources of noise in these water bodies include wind, waves, precipitation, and animals (e.g., cetaceans). Anthropogenic sources of noise can arise from commercial and recreational fishing or boating activities. Aircraft operating in an area’s airspace can also add to the noise environment. Natural and anthropogenic noises account for the total ambient or background noise (Richardson et al., 1995). Surrounding physical characteristics, such as sediment type, affect the distance noise may travel. Generally, hardbottoms propagate noise further than sandy softbottoms (Richardson et al., 1995).

### **3.3.2 Existing Condition**

#### **Santa Rosa Island**

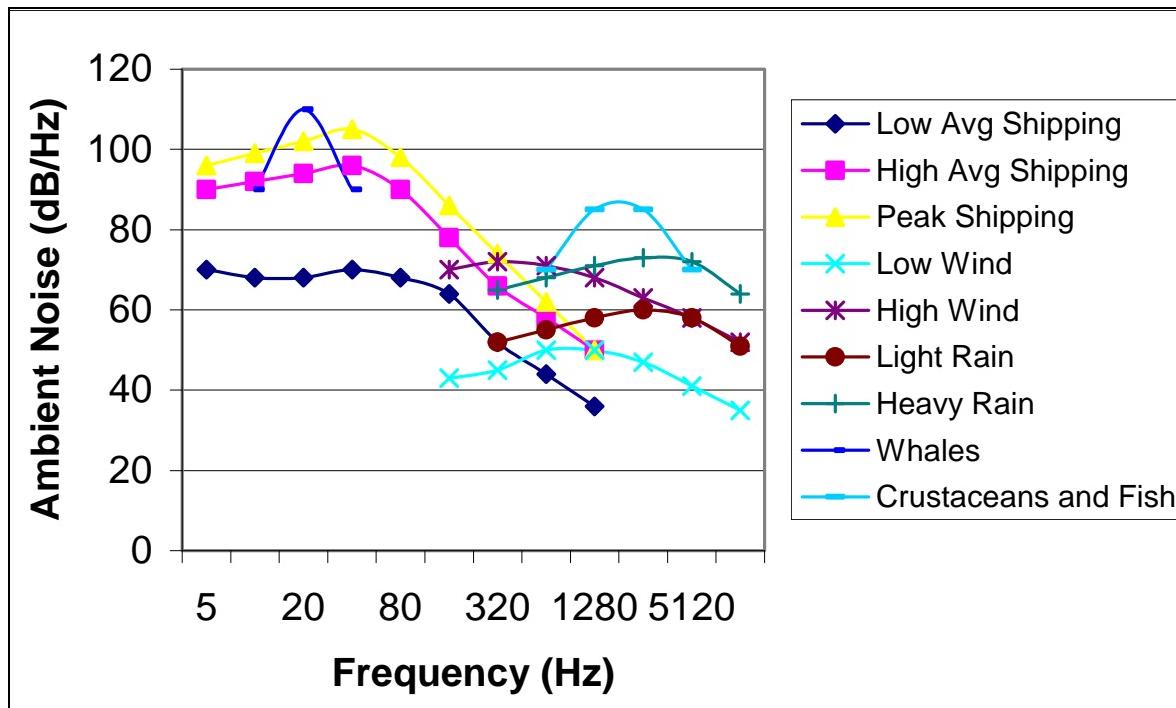
Wind and surf are the major natural sound sources on SRI. Anthropogenic noise sources include vehicles and aircraft supporting the various military missions on SRI. Test Area A-15 is located within a 13-mile restricted-access section of SRI, so public traffic noise is not an issue on SRI. However, the airspace around SRI and Test Area A-15 is frequently used by both civil and military aircraft that contribute to the ambient noise.

#### **Gulf of Mexico**

Ambient (natural) noise in the ocean may arise from natural sources: wind action on the sea surface, rain or hail striking the sea surface, and various types of marine life. Ambient noise sources may be continuous and persistent or transient and intermittent. In open oceans, the primary persistent natural noise source tends to be wind action on the sea surface (Figure 3-2). Marine animals also contribute to the ambient noise environment. Cetaceans such as bottlenose dolphins that use echolocation for navigation and locating prey occur often in the nearshore waters off SRI.

Anthropogenic (man-made) sound within the project area consists of commercial and recreational vessel traffic, military operations onshore, and dredging. Although access to SRI is restricted, the nearshore waters are generally open to the public, so commercial and recreational

vessels operate in the nearshore waters. In open oceans, the primary persistent anthropogenic noise source tends to be commercial shipping (Figure 3-2). Surface ships generate noise via a number of mechanisms, the most important being propeller blade cavitation.



**Figure 3-2. Ambient Noise Level Bounds in the Northern Gulf of Mexico**

Source: Renner, 1995

Ambient and current anthropogenic noise in the northern Gulf of Mexico ranges from approximately 40 dB to about 110 dB. To compare, all the different sounds were modeled using decibels referenced to a common pressure (1 micropascal) and a common distance (1 m [3.28 ft]).

Figure 3-2 illustrates the variability from all of the potential ambient and anthropogenic noise sources described in this paragraph. The frequencies of the noise sources are provided along the X-axis with the ambient noise levels for the sources plotted along the Y-axis. The noise levels depicted in this graphic are not additive among the various sources and are not weighted for human hearing sensitivity. In the northern Gulf, the lower range on average ambient and current anthropogenic noise is defined at the low frequencies by shipping noise in regions outside the shipping lanes. At high frequencies, the lower range is defined by wind noise at low wind speeds. Other factors can contribute to ambient noise and can raise noise levels intermittently. The onset of rain raises high-frequency noise levels by 10 dB or more. Marine life of various types can raise noise levels near 20 Hz (marine mammals), in the range of a few kilohertz (kHz) (crustaceans and fish), and in the tens to hundreds of kHz (again, marine mammals). While the occurrence of biologic noise is limited in time and location, when present, noise levels up to 30 dB greater than background levels can be produced.

## 3.4 BIOLOGICAL RESOURCES

### 3.4.1 Definition of the Affected Resource

This section describes biological resources found on the terrestrial (land) areas of the ALRT project area on SRI and in the marine waters adjacent to the island. Emphasis is placed on identifying sensitive habitats and species that are within federal and/or state mandates or are of special concern.

### 3.4.2 Existing Condition

#### Ecological Associations

A classification system of ecological associations has been developed based on flora, fauna, and geophysical characteristics. These ecological associations are described in the Integrated Natural Resources Management Plan, Eglin AFB (U.S. Air Force, 2002). The Eglin Beach Resources (EBR) are classified as part of the Barrier Island Association, which includes three Eglin-owned land tracts in Santa Rosa, Okaloosa, and Gulf Counties. The westernmost Eglin-owned unit, on SRI, is 21 km (13 mi) long and 0.16 to 0.97 km (0.1 to 0.6 mi) wide and is located in Santa Rosa and Okaloosa Counties. The central unit, known locally as Okaloosa Island, is 6.4 km (4 mi) long and is located in Okaloosa County. Both units are very narrow and share the Gulf of Mexico as their southern boundary. The northern boundary of the western unit is Santa Rosa Sound. The northern boundary for the central unit is Choctawhatchee Bay. The eastern unit, known as Cape San Blas, consists of approximately 3.44 km<sup>2</sup> (850 acres) with 4.8 km (3 mi) of beachfront. The southern boundary of Cape San Blas is the Gulf of Mexico, and the northern boundary is St. Joseph Bay.

The EBR terrestrial area consists of only one vegetative community type, the coastal upland community. Within this community are sand beaches, beach dunes, coastal grasslands, coastal interdunal swales, mesic flatwoods, and scrub. Table 3-1 summarizes the plant species normally found in the various communities of EBR.

**Table 3-1. Plant Species Commonly Found in the Ecological Associations of Eglin Beach Resources**

<b>Beach Dune</b>		<b>Scrub</b>	
Sea oats	<i>Uniola paniculata</i>	Rosemary	<i>Ceratiola ericoides</i>
Sea rocket	<i>Cakile constricta</i>	Saw palmetto	<i>Serenoa repens</i>
Beach elder	<i>Iva imbricata</i>	Slash pine	<i>Pinus elliotti</i>
Evening primrose	<i>Oenothera humifosa</i>	Scrub oaks	<i>Quercus geminata, Q. myrtifolia</i>
Milk pea	<i>Galactia microphylla</i>	Lichens	<i>Cladonia leporina, Cladina evansii</i>
Godfrey's goldenaster	<i>Chrysopsis freyi</i>	Woody goldenrod	<i>Chrysoma pauciflosculosa</i>
Seashore paspalum		<b>Maritime Hammock</b>	
Beach cordgrass	<i>Paspalum distichum</i>	Live oaks	<i>Quercus virginiana</i>
Beach morning glory	<i>Ipomoea stolonifera</i>	Cabbage palms	<i>Sabal palmetto</i>
Bitter panicum	<i>Panicum amarum</i>	Magnolia	<i>Magnolia grandiflora</i>
		Scrub oak	<i>Quercus geminata</i>
		Yaupon holly	<i>Ilex vomitoria</i>
		Saw palmetto	<i>Serenoa repens</i>

*Continued on the next page...*

**Table 3-1. Plant Species Commonly Found in the Ecological Associations of Eglin Beach Resources, Cont'd**

<b>Coastal Interdunal Swale</b>		<b>Mesic Flatwoods</b>	
Beach cordgrass	<i>Spartina patens</i>	Cabbage palms	<i>Sabal palmetto</i>
Saltbush	<i>Baccharis halimifolia</i>	Slash pine	<i>Pinus elliotti</i>
Sand pine	<i>Pinus clausa</i>	Willow	<i>Salix floridana</i>
Sand live oak	<i>Quercus geminata</i>	Sawgrass	<i>Clamadium jamaicense</i>
Lichen	<i>Cladonia leporina</i>	Vines	<i>Vitis munsoniana</i>
Perforate lichen	<i>Cladonia perforata</i>	Vines	<i>Mikania cordifolia</i>
White-topped sedge	<i>Dichromena colorata</i>	Shrub	<i>Myrica cerifera</i>
Ludwigia	<i>Ludwigia alata</i>	Yaupon holly	<i>Ilex vomitoria</i>
Nutrush	<i>Scleria verticillata</i>	Fetterbush	<i>Lyonia lucida</i>
Seashore paspalum	<i>Paspalum distichum</i>	Gallberry	<i>Ilex glabra</i>
Gulf cordgrass	<i>Spartina spartinae</i>	Wicky	<i>Kalmia hirsuta</i>
Marsh elder	<i>Iva frutescens</i>	Mint	<i>Conradina canescens</i>
Muhly grass	<i>Muhlenbergia capillaris</i>	Lichens	<i>C. leporina and C. perforata</i>

### 3.4.3 Sensitive Habitats

Important habitats found within the project area include outstanding natural areas, coastal protection areas, wetlands, and floodplains.

#### Beach and Barrier Island Habitats

The EBR terrestrial area consists of only one vegetative community type, the coastal upland community. Within this community are sand beaches, beach dunes, coastal grasslands, coastal interdunal swales, mesic flatwoods, and scrub. Table 3-1 summarizes the plant species normally found in the various communities of EBR. More detail on these communities may be found in relative Section 7 Consultation documents.

#### Outstanding Natural Areas/Coastal Protection Areas

SRI is considered an outstanding natural area based on the excellent condition of much of its beach dune, coastal grassland, coastal interdunal swale, mesic flatwood, and scrub communities. SRI also supports a number of populations of the federally listed perforate reindeer lichen. Based on a 1992 Florida Natural Areas Inventory report on coastal upland communities (Johnson et al., 1992), coastal protection areas were informally designated on SRI (Figure 3-1).

### 3.4.4 Marine Protected Areas

Marine protected areas include Gulf sturgeon critical habitat, EFH, artificial reefs, and sea turtle nesting areas. These are described in further detail below.

#### Gulf Sturgeon Critical Habitat

Critical habitat for the Gulf sturgeon was designated in March 2003, based on the primary constituent elements essential for its conservation, as defined in the 2003 Federal Register. These

seven primary constituents include food, spawning areas, resting areas, water and sediment quality, and unobstructed migration pathways.

Gulf sturgeon critical habitat is composed of 14 geographic areas, or units. The units collectively encompass almost 2,800 river km (1,740 mi) and over 6,000 km<sup>2</sup> (2,317 mi<sup>2</sup>) of estuarine and marine habitat. Critical habitat extends from the mean high water line to 1 nautical mile (NM) (1.9 km [1.18 mi]) offshore for the Gulf of Mexico. Of interest for purposes of this EA are Units 10 and 11. Unit 10 includes the Santa Rosa Sound, bounded on the west by the Florida State Highway 399 bridge in Gulf Breeze, Florida, and the east by U.S. Highway 98 bridge in Fort Walton Beach, Florida. Unit 11 includes the nearshore waters of the Gulf of Mexico in Escambia, Santa Rosa, Okaloosa, Walton, Bay, and Gulf Counties in Florida.

Crustaceans, mole crabs, sand fleas, various amphipod species, and lancelets (Abele and Kim, 1986) are all part of the Gulf sturgeon diet. These species occupy the nearshore (up to 1 NM [1.9 km or 1.18 mi]) Gulf of Mexico waters between Pensacola and Apalachicola Bays offshore. As a result, this area has been designated as critical habitat for the Gulf sturgeon. The Santa Rosa Sound is designated as critical habitat because it provides one continuous migratory pathway from Choctawhatchee Bay, to Pensacola Bay, to the Gulf of Mexico for feeding and genetic interchange. Recent locations of subadult and adult Gulf sturgeon within the Santa Rosa Sound confirm the sound's present use by the Choctawhatchee River subpopulations (Fox et al., 2002; Parauka, 2003). Gulf sturgeon have been located midchannel and in shoreline areas in 2- to 5.2-m (6.6- to 17.1-ft) depths and sand substrate. The approximate length of this critical habitat unit is 52.8 km (33 mi).

### Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act requires federal agencies to assess potential impacts to EFH for commercial fisheries managed by National Oceanic and Atmospheric Administration (NOAA) Fisheries. EFH is described as those waters and substrate necessary for fish spawning, feeding, or growth to maturity. Some potential threats to EFH are certain fishing practices, marina construction, navigation projects, dredging, alteration of freshwater input into estuaries, and runoff. Many commercial species are migratory, moving from estuaries to open Gulf waters or up and down the coast with the seasons. Numerous species pass through or occur in the region and thus the essential habitat of one commercial fish species or another at any given time of the year may fall within the Eglin Gulf Test and Training Range (EGTTR) (Gulf of Mexico Fishery Management Council, 1998).

EFH has been identified by the NMFS for several species within the EGTTR; these species and their habitat by life stage are presented in Table 3-2.

**Table 3-2. Managed Species for Which Essential Fish Habitat Has Been Identified in the EGTTR**

Species	Life Stages	Habitat
Black grouper	Adult, juveniles/subadults, larvae, eggs (spawning area)	Hardbottom; shore to 150 m (492 ft)
Brown shrimp	Adult	Softbottom; estuarine dependent
Cobia	Adult, juveniles/subadults, larvae, eggs (spawning area)	Pelagic; drifting or stationary floating objects

**Table 3-2. Managed Species for Which Essential Fish Habitat Has Been Identified in the EGTTR, Cont'd**

Species	Life Stages	Habitat
Corals	All life stages	Hardbottom
<i>Sargassum</i>	All life stages	Pelagic
Dolphin (mahi)	Adult, juveniles/subadults, larvae, eggs (spawning area)	Pelagic; floating objects
Gag grouper	Adult	Hardbottom
Greater amberjack	Adult, juveniles/subadults, larvae, eggs (spawning area)	Pelagic and epibenthic; reefs and wrecks; to 400 m (1,312 ft)
Gray snapper	Adult	All bottom types; 0 to 130 m (427 ft)
Gray triggerfish	Adult	Hardbottom
King mackerel	Adult	Pelagic
Lesser amberjack	Adult, juveniles/subadults, larvae, eggs (spawning area)	Pelagic
Lane snapper	Adult, juveniles/subadults, larvae, eggs (spawning area)	Soft- and hardbottom; 0 to 130 m (0 to 427 ft)
Little tunny	Adult, juveniles/subadults, larvae, eggs (spawning area)	Pelagic
Pink shrimp	Adult (spawning area)	Soft and hardbottom; inshore to 65 m (214 ft)
Red drum	Adult (spawning area)	Softbottom, oyster reefs, estuarine; to 40 m (131 ft)
Red grouper	Adult, juveniles/subadults, larvae, eggs (spawning area)	Hardbottom; 3 to 200 m (10 to 656 ft)
Red snapper	Adult, juveniles/subadults, larvae, eggs (spawning area)	Hardbottom, pelagic
Scamp	Adult	Hardbottom
Stone crab	Adult (spawning area)	Soft- or hardbottom or vegetated bottom
Spiny lobster	Adult	Hardbottom
Spanish mackerel	Adult, juveniles/subadults, larvae, eggs (spawning area)	Pelagic; inshore to 200 m (656 ft)
Tilefish	Adult (spawning)	Softbottom, steep slopes; 80 to 540 m (262 to 1,772 ft)
Vermillion snapper	Adult, juveniles/subadults, larvae, eggs (spawning area)	Hardbottom; 20 to 200 m (65.6 to 656 ft)
White shrimp	Adult, juveniles/subadults, larvae, eggs (spawning area)	Softbottom; inshore to 40 m (131 ft)
Yellowtail snapper	Adult, juveniles/subadults, larvae, eggs (spawning area)	Hardbottom; 0 to 180 m (0 to 591 ft)

Source: Gulf of Mexico Fishery Management Council, 1998; NOAA Data Atlas, 1985  
EGTTR= Eglin Gulf Test and Training Range; m=meters

## Seagrasses

The Florida Marine Research Institute estimates total seagrass coverage in Choctawhatchee Bay and the Okaloosa County portion of Santa Rosa Sound at 16.83 km<sup>2</sup> (4,160 acres) (Sargent et al., 1995). The nearest major seagrass bed in the Gulf of Mexico is located outside of the study area. The habitat on the Gulf side and the sound side of SRI is a sandy/silty substrate, which does not support seagrass beds.

### Sargassum Community

*Sargassum*, or Gulfweed, a dominant genus in shallow waters, is a free-floating brown alga that is present in the tropics and subtropics including the Gulf. The *Sargassum* mats drift in oceanic eddies. These mats provide an important niche for numerous species and support a community of animals found nowhere else. Fishes occupying the upper water column (0 to 200 m [0 to 656 ft]) use *Sargassum* clumps for food, while others lay their eggs in *Sargassum*. Between 1971 and 1976, 15 families and 40 species of fish were collected at 62 *Sargassum* locations within the eastern Gulf (Bortone et al., 1977). Sea turtle hatchlings also use *Sargassum* as a vehicle for passive migration and shelter (Collard and Ogren, 1990), and the abundance of invertebrate fauna that inhabit the mats is an important food source for sea turtles (Carr and Meylan, 1980). The biomass of *Sargassum* has been decreasing in the Gulf; some believe the decrease is due to human pollutant sources, such as oil spills and contaminant transport. It has been shown that *Sargassum* can accumulate hydrocarbons and some toxic metals (Johnson and Braman, 1975). A decrease in this resource could have adverse effects on the multitude of species that depend on it for survival.

### Sensitive Species

Sensitive species include those flora and fauna with federal endangered or threatened status, federal candidate species, and state endangered, threatened, and species of special concern status (U.S. Air Force, 1995). An endangered species is one that is in danger of extinction throughout all or a significant portion of its range. A threatened species is any species that is likely to become endangered in the future throughout all or a significant portion of its range due to loss of habitat, anthropogenic effects, or other causes. Federal candidate species and all state-listed species are those that should be given consideration during planning of projects but are not currently protected under the ESA. Eglin's Integrated Natural Resources Management Plan specifies an overall goal to continue to protect and maintain populations of native threatened and endangered plant and animal species within the guidelines of ecosystem management (U.S. Air Force, 2002).

Eglin Natural Resources Section (NRS) (96 CEG/CEVSN) protects species through habitat management, specifically through the management of conservation targets as identified in An Assessment of Desired Future Conditions for Focal Conservation Targets on Eglin Air Force Base (Sutter et al., 2001). By managing these conservation targets, which include multiple sensitive species and habitats, 96 CEG/CEVSN also supports the management of many other species and habitats, including state-listed species.

Plants and animals on EBR whose existence is determined to be threatened or endangered, or potentially so, may be afforded protection or special consideration under the ESA, or Rules 3927.003, .004, and .005 of the FAC. State species of special concern are offered no statutory protection, but state officials urge environmental managers to consider their presence when planning activities, and Eglin policy encourages this cooperation. The federal list of threatened and endangered plants and animals is maintained by the USFWS, while state lists are maintained

by the Florida Fish and Wildlife Conservation Commission (FWC) (animals) and the Florida Department of Agriculture and Consumer Services (plants).

Air Force projects that may affect federally protected species, species proposed for federal listing, and critical habitat for protected species are subject to Sections 7 and 10 of the ESA prior to the irreversible or irretrievable commitment of these resources (U.S. Air Force, 1995). A Section 7 consultation with USFWS would be required if the 96 CEG/CEVSN determined that the action might affect threatened or endangered species. The 96 CEG/CEVSN would then decide if the action would potentially take a species. If a take were possible, then formal Section 7 consultation would be required. If no takes were likely, then an informal Section 7 consultation would be required. If the Proposed Action were likely to adversely affect a federally protected species, USFWS would determine whether jeopardy or nonjeopardy to the species population would occur. Table 3-3 details the status and location of sensitive species on and near EBR.

**Table 3-3. Sensitive Species On and Near Eglin Beach Resources**

Scientific Name	Common Name	Status	Location
<b>Reptiles</b>			
<i>Caretta caretta</i>	Loggerhead Sea Turtle	FT, ST	SRI
<i>Chelonia mydas</i>	Green Sea Turtle	FE, SE	SRI
<i>Dermochelys coriacea</i>	Leatherback Sea Turtle	FE, SE	SRI
<b>Birds</b>			
<i>Charadrius alexandrinus</i>	Snowy Plover	ST	SRI
<i>Charadrius melanotos</i>	Piping Plover	FT, ST	SRI
<i>Egretta caerulea</i>	Little Blue Heron	SSC	SRI
<i>Egretta thula</i>	Snowy Egret	SSC	SRI
<i>Egretta tricolor</i>	Tricolor Heron	SSC	SRI
<i>Eudocimus albus</i>	White Ibis	SSC	SRI
<i>Rynchops niger</i>	Black Skimmer	SSC	SRI
<i>Sterna antillarum</i>	Least Tern	ST	SRI
<b>Mammals</b>			
<i>Peromyscus polionotus leucocephalus</i>	Santa Rosa Beach Mouse	CT	SRI
<i>Tursiops truncatus</i>	Atlantic Bottlenose Dolphin	MMPA	Gulf of Mexico and Santa Rosa Sound
<i>Trichechus manatus latirostris</i>	Florida Manatee	FE	Gulf of Mexico and Santa Rosa Sound
<b>Plants</b>			
<i>Cladonia perforata</i>	Florida Perforate Lichen	FE, SE, CT	SRI

CT = Eglin conservation target; FE = Federally endangered; FT = Federally threatened; SE = State endangered; SRI = Santa Rosa Island; SSC = State species of special concern; ST = State threatened; MMPA = Marine Mammal Protection Act

The Florida perforate lichen (*Cladonia perforata*) was considered then excluded from further assessment because the Proposed Action would not occur near Florida perforate lichen areas on SRI.

### 3.4.5 Sea Turtles

Five species of sea turtles inhabit the waters in or near the eastern Gulf. The sea turtle species are Atlantic loggerhead (*Caretta caretta*) or called just loggerhead, Atlantic green (*Chelonia mydas*) or called just green, leatherback (*Dermochelys coriacea*), hawksbill (*Eretmochelys imbricata*), and Kemp's ridley (*Lepidochelys kempii*). Of the five species protected by state and federal governments, all but the loggerhead are classified as endangered. The loggerhead is classified as threatened by both the state of Florida and the federal governments (Patrick, 1996). The smallest species is the Kemp's ridley 34 to 45 kilograms (75 to 100 pounds) and the largest is the leatherback (up to 906 kilograms [2,000 pounds] and 2.44 m [8 ft] long). Sea turtles spend their lives at sea and only come ashore to nest. It is theorized that young turtles, between the time they enter the sea as hatchlings and their appearance as subadults, spend their time drifting in ocean currents among seaweed and marine debris. The population numbers of sea turtles has been gravely reduced during the 20<sup>th</sup> century due to illegal domestic harvesting of eggs and turtles in the United States and its territories as well as other important nesting areas around the world. Sea turtles are identified in Table 3-4 according to their status of federal protection in the Gulf of Mexico. Density and abundance estimates were derived from NMFS aerial surveys (Davis et al., 2000).

**Table 3-4. Sea Turtle Statistics from Surveys of the Continental Shelf (1996-1998)**

Shelf	Number Sighted	Individuals/100 km <sup>2</sup>	Abundance Estimate
Loggerhead			
Overall	84	4.077	503
Summer	39	3.891	480
Winter	45	4.253	524
Kemp's ridley	2	0.097	12
Leatherback	4	0.194	24
Unidentified	7	0.340	42

Source: Davis et al., 2000  
km<sup>2</sup> =square kilometers

#### Atlantic Green Sea Turtle

The green sea turtle was listed as federally threatened on 28 July 1978 in all its eastern range of North America, except in Florida where it is listed as endangered. It is also state-listed as endangered. In the United States, it nests on southern Florida beaches with a few exceptions in the northern Gulf of Mexico and North Carolina (USFWS, 2005). The officially recognized nesting and hatching season for the green sea turtle extends from 01 May through 31 October in Florida's panhandle. Nesting in the panhandle, however, has been consistently documented as typically an every other year event since 1990, with incubation periods ranging from 60 to 90 days. In 2004, sea turtle nesting season did not result in any green sea turtle nests as predicted. Green sea turtles have since nested in 2005, 2006, and 2007 on SRI. Eglin AFB SRI property supports the highest number of green sea turtle nests in northwest Florida (Figure 3-3). Primarily a tropical herbivore, the juveniles are frequently found in the Gulf of Mexico in areas where there is an abundance of seagrass (USFWS, 2005).



**Figure 3-3. Sea Turtle Nests by Species Within and Around Project Area**

### Loggerhead Sea Turtle

The loggerhead turtle is federally listed as threatened worldwide and gained its status on 28 July 1978. Loggerhead nests in Florida account for 90 percent of all loggerhead nests in the United States. They are the most commonly seen sea turtle in the southeastern United States and may be found near underwater structures and reefs. The loggerhead turtle population is continuing to decline in the southeastern United States, and shrimping is thought to have played a significant role in this decline. The diet of loggerheads consists of gastropods, mollusks, coelenterates, and cephalopods.

### Kemp's Ridley Sea Turtle

The Kemp's ridley sea turtle received its endangered status, under the ESA, on 02 December 1970. Adults have the most restricted distribution of any sea turtle and are usually confined to the Gulf of Mexico, while post-pelagic turtles may be found over crab-rich sandy or muddy bottoms. As hatchlings, the species presumably eat *Sargassum* and small organisms associated with the floating *Sargassum*. Adults feed mainly on crabs.

## Leatherback Sea Turtle

The leatherback sea turtle was originally listed as endangered on 02 June 1970. Leatherbacks are a migratory species with a worldwide distribution. This species nests in the tropics but may range as far north as Canada and the northern Pacific. The leatherback feeds primarily on jellyfish but occasionally will eat structural sea urchins, squid, crustaceans, tunicates, fish, blue-green algae, and floating seaweed.

## Hawksbill Sea Turtle

The hawksbill sea turtle was originally listed as endangered on 02 June 1970. It remains endangered as listed by the state of Florida and the USFWS under the ESA. Continued illegal international trade in tortoise shell and use of hawksbill meat and eggs are a major threat to the turtles' survival. Though rare in northeastern Gulf waters, nesting for the hawksbill turtle has been reported along the Gulf coast and is seen with some regularity in the waters near the Florida Keys (MMS, 1986). Although mostly a spongivore, this species feeds on other invertebrates that encrust coral reefs. Commercial exploitation is the major cause of the continued decline of the species.

## Sea Turtle Nesting at SRI

The sea turtle reproduction cycle on SRI has been divided into four time periods based on historical data (Table 3-5). During the first time period, only nesting occurs. During the second time period, hatchlings emerge from previously laid nests while adult sea turtles continue to come ashore to lay new nests. During the third time period, adults have ceased to come ashore for nesting, while hatchlings continue emerging from existing nests. During the fourth time period (off season), neither nesting nor hatching behavior is expected to occur. The earliest and latest possible dates for all species were selected to produce the combined species time periods.

Based on the data presented in Table 3-5, actions taking place on SRI between 12 November and 01 May effectively have a low probability of directly impacting sea turtle nesting and hatching activities. Actions occurring from 01 May to 12 November may affect nesting and hatching.

**Table 3-5. Sea Turtle Nesting Periods by Species**

Species	Nesting Only	Nesting and Hatching	Hatching Only	Off-Season
<i>Caretta caretta</i>	May 23 – Jul 24	Jul 25 – Aug 26	Aug 27 – Nov 5	Nov 6 – May 19
<i>Chelonia mydas</i>	May 20 – Jul 24	Jul 25 – Aug 22	Aug 23 – Nov 12	Nov 13 – May 19
<i>Dermochelys coriacea</i>	May 12 – Jun 19	NA	Aug 5 – Sep 21	Sep 22 – May 11
<b>Combined Species</b>	<b>May 12 – Jul 24</b>	<b>Jul 25 – Aug 22</b>	<b>Aug 23 – Nov 12</b>	<b>Nov 6 – May 11</b>

NA = not applicable

Based on data collected between 1989 and 2006 on the 29 km (18 mi) of Eglin SRI beaches, the average annual nesting density for loggerheads is approximately 1.24 nests per mile (Table 3-6). During this period, 382 loggerhead nests were recorded. Peak loggerhead nesting on SRI occurs in June and July, with approximately 84.3 percent of nests established during this period

(Figure 3-4, Table 3-6). The average nest incubation length is 67.28 days. Loggerhead hatching peaks in August and September. The average annual nest emergence success rate is 55.88 percent.

**Table 3-6. Sea Turtle Nesting on SRI, Eglin AFB**

Parameter	Loggerhead	Green	Leatherback	Kemp's Ridley
Total number nests	382	117	3	Possibly one in 2004; eggs sent off for DNA testing
Years nesting documented	1989-2006	1990, 1992, 1994, 1996, 1997, 1998, 2000, 2002, 2003, 2005, 2006	2000	No data
Earliest documented nest	May 23	May 20	May 12	No data
Latest documented nest	Aug 26	Aug 22	June 19	No data
Average annual number of nests	21.22	10.63	Insufficient data	No data
Average annual number of nests per mile	1.24	.62	Insufficient data	No data
Peak nesting period (two peak months)	June and July	June and July	Insufficient data	No data
Percentage of nests laid during the two peak months	86%	83%	Insufficient data	No data
Peak hatching period (two peak months)	August and September	August and September	Insufficient data	No data
Average number eggs in a nest	113	136	Insufficient data	No data
Average annual nest emergence success rate	56%	55%	Insufficient data	No data
Incubation period (range)	52-89 days	51-82 days	Insufficient data	No data
Incubation period (average)	67 days	69 days	Insufficient data	No data
Estimated number of hatchlings produced annually <sup>1</sup>	2,398	1,446	Insufficient data	No data

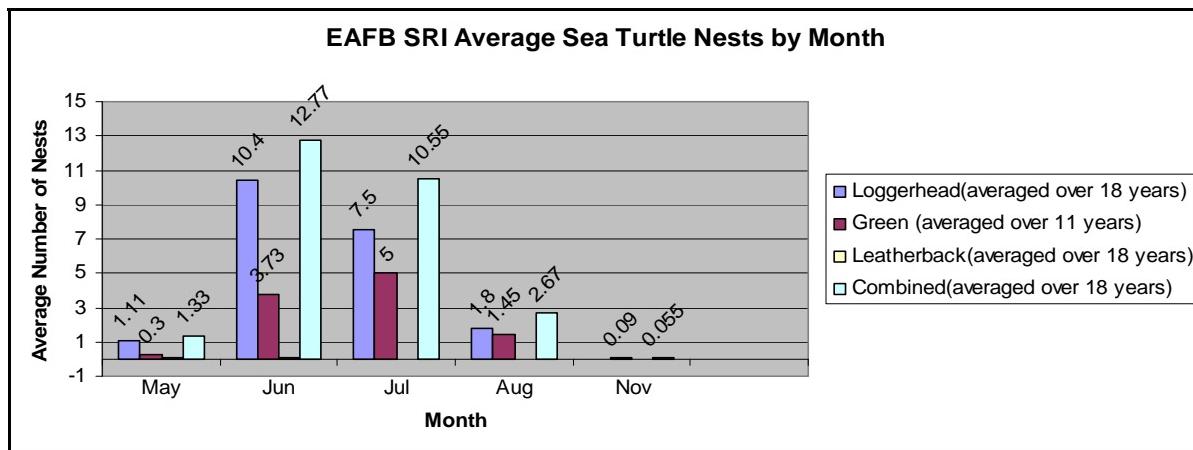
1. Assumes 100 percent survival

Eglin's SRI property supports the greatest number of green sea turtle nests in northwest Florida. Green sea turtles nested on SRI every other year from 1990 to 2002. However, in 2003 there were four green sea turtle nests, in 2004 there were none, in 2005 there were seven, and in 2006 there were six, possibly indicating a new trend. Also, there was one nest in 1997. From 1990 to 2006, 130 green sea turtle nests were recorded (Table 3-6). The average annual nesting density for green sea turtles is approximately 0.62 nests per mile. Peak green sea turtle nesting occurs in June and July, with approximately 82.1 percent of nests established during this period (Table 3-6). The average nest incubation length is 68.54 days, with a range from 51 to 82 days. Green sea turtle hatching peaks in August and September. The average annual nest emergence success rate is 55.2 percent.

Leatherback nesting has been documented only one year on Eglin SRI, during 2000. Three nests were laid in May and June and hatched in August and September. The three nests were located

between Test Areas A-7 and A-10. A Kemp's ridley sea turtle may have nested for the first time on Eglin SRI in 2004 (Miller, 2006).

The peak nesting season can be estimated using the information in Figure 3-4. The information displayed in the figure indicates that loggerhead nesting peaks in June. Dividing the average number of nests occurring in June by 30 days yields a peak nesting emergence rate of 0.35 nests per night. By the same method, during a green turtle nesting year, the peak nesting rate is calculated to be 0.16 nests per night (number of green turtle nests in July, divided by 31 days). To determine the peak nesting rate within a 0.8-km (0.5-mi) section of beachfront, the peak nesting emergence rate for each species is divided by the number of 0.8-km (0.5-mi) segments that make up the Eglin AFB sea turtle nesting beach (i.e., 34). Therefore, the peak rate of loggerhead turtle nesting emergences is 0.01 nests per night per 0.8 km (0.5 mi), and the peak rate of green turtle nesting emergences is 0.005 nests per night per 0.8 km (0.5 mi). Because only three leatherback nests have been documented on Eglin AFB SRI over an 18-year period, the leatherback nesting emergence rate is effectively zero.



**Figure 3-4. Eglin AFB SRI Average Sea Turtle Nest Occurrences by Month (1989-2006)**

Because historical hatchling emergence data for Eglin AFB SRI are incomplete, an expected average emergence by month was calculated for each species based on the available emergence data. Of the 210 recorded hatching dates, only four (1.91 percent) occurred in July. If this percentage is applied to the total number of loggerhead nests recorded, 7.30 loggerhead nests would be expected to have hatched in July over the 18-year data collection period, yielding an average of 0.405 loggerhead hatchings annually during the month of July. Once again, the total for green sea turtles was averaged over 11 years and the combined average over 18 years, which means that the green sea turtle average would be less than the 11-year average, so it would contribute less to the combined 18-year average. Table 3-7 summarizes this information and also provides an estimated number of hatching events expected in each given month. Emergence dates are not available for a randomly selected sample of nests for each species and, therefore, these averages may be slightly skewed. However, because emergence dates were available for 276 out of the 502 total nests (55 percent), the calculated averages for the number of nests hatching per month should suffice for purposes of this analysis (Table 3-7).

**Table 3-7. Eglin AFB SRI Calculated Average Sea Turtle Hatching Occurrences by Month**

Month	Parameter	Loggerhead	Green	Leatherback	Combined
	Total nests	382	117	3	502
	No. nests with recorded hatching dates	210	64	2	276
July	Calculated average	0.05	0.33	0.0	0.61
August	Calculated average	10.61	2.99	0.0	12.43
September	Calculated average	7.68	4.48	0.18	10.69
October	Calculated average	1.92	1.99	0.0	3.13
November	Calculated average	0.20	0.0	0.0	0.20

### 3.4.6 Marine Mammals

#### Florida Manatee

The Florida manatee (*Trichechus manatus latirostris*), or West Indian manatee, is listed as federally endangered. Manatees are found in the temperate and equatorial waters of the southeastern United States, the Caribbean basin, northern South America, and equatorial West Africa. Manatees generally disperse during the warm months as water temperatures rise and aquatic plant growth accelerates, and move south during cold weather, aggregating at natural or artificial warm-water sources such as springs. Manatees inhabit coastal, estuarine, and riverine systems. They are primarily herbivorous; feeding on many types of aquatic vegetation, and may occasionally consume shoreline vegetation and fish. Manatees are sighted infrequently in the north Florida panhandle. Winters in north Florida prevent the cold-sensitive manatees from occurring year-round. Their occasional presence is due to migration from warmer regions. NRS records indicate one dead manatee (Eglin SRI property, January 2002), and three live manatees (two in East Bay River, June 2002, and one in Bear Creek Marina, September 2005).

#### Atlantic Bottlenose Dolphin

The average herd or group size of Atlantic bottlenose dolphins (*Tursiops truncatus*) in shelf and slope waters was approximately four with ten individuals per herd as determined by GulfCet II surveys of eastern Gulf waters. Migratory patterns from inshore to offshore are likely associated with the movements of their prey rather than a preference for a particular habitat characteristic (such as surface water temperature). The diet of Atlantic bottlenose dolphins consists mainly of fish, crabs, squid, and shrimp. The Marine Mammal Stranding Network documented 702 strandings of bottlenose dolphins along the Florida Gulf coast from 1989 to 1996.

### 3.4.7 Piping Plover

This birds' primary winter range is along the Atlantic and Gulf coasts from North Carolina to Mexico and into the Bahamas and West Indies. Piping plovers are commonly documented during winter in the Florida panhandle, with highest numbers of birds occurring in Franklin, Gulf, and Bay Counties. Even though Florida has not been considered a primary wintering area for piping plover, diminishing habitat along other Gulf coast areas may be affording the piping plover new wintering grounds in Florida. At Eglin the winter foraging period runs from 15 July to 15 May. These wintering grounds are still considered less suitable, thus forcing the piping plover to utilize isolated patches. As a result, critical habitat has been designated for piping plovers along the Gulf coast of Florida, a portion of which covers SRI north of Test Area A-18.

### 3.4.8 Gulf Sturgeon

The Gulf sturgeon (*Acipenser oxyrinchus desotoi*) is federally listed as threatened. It is an anadromous fish that migrates from salt water into large coastal rivers to spawn and spend the warm months. This species occurs predominantly in the northeastern Gulf of Mexico, where it ranges from the Mississippi Delta east to the Suwannee River in Florida and can also be found in the bays and estuaries throughout its range. Gulf sturgeons have never been found in water deeper than 18.3 m (60 ft) offshore of Eglin AFB (USFWS, 2003). The sturgeon that have been located offshore of Eglin AFB were found in less than 6.1 m (20 ft) of water (USFWS, 2003). The Gulf sturgeon is thought to feed primarily during the winter and spring in offshore or estuarine habitats. Food items include amphipods, isopods, annelids, dipterans, blue crab parts, lancelets, brachiopods, and plant material.

### 3.4.9 Santa Rosa Beach Mouse

The Santa Rosa beach mouse (*Peromyscus polionotus leucocephalus*) is one of eight beach mouse subspecies and is the only subspecies not currently listed by either the state or the federal government. Santa Rosa beach mice are nocturnal and construct burrows in dunes. Potential beach mouse habitat includes the entire SRI, but their preferred habitat is frontal dune and scrub habitat within the coastal dune ecosystem. Their diet consists of various plant seeds and insects. This subspecies, which occurs only on SRI, was decimated after storm surge from Hurricane Opal in 1995 destroyed dune habitat. Beach mouse numbers have been increasing, however, since Opal.

Monthly track count surveys conducted by Eglin NRS personnel indicated a 40 percent increase in population from 1996 to 2001 (U.S. Air Force, 2002). Hurricane Ivan in 2004 also decimated a large percentage of dune habitats. Preliminary results indicate that beach mice are still present; however, it is too early to determine the severity of impacts to the populations. Prior to Hurricane Ivan, quarterly track count surveys were conducted; since the hurricane Eglin NRS has increased their surveys to monthly. The monthly surveys will continue to gain a better understanding of impacts to the population. In February 2007, Eglin NRS incorporated the FWC tracking tube survey protocol for the Santa Rosa beach mouse. Tracking tube surveys have been developed to incorporate the ease and frequency of visual tracking surveys with the subjectivity of live trapping (FWC, 2006). Current threats to this population include predation by feral cats and loss of dune habitat from recreational foot traffic and storms.

### 3.4.10 Shorebirds and Wading Birds

Shorebird nesting season at SRI runs from 1 April through 31 August. There is a large historical shorebird nesting area near the location of the beach club prior to Hurricane Ivan. Typical shorebirds found on SRI include the snowy plover (*Charadrius alexandrinus*), state listed as threatened; little blue heron (*Egretta caerulea*), a state species of special concern; snowy egret (*Egretta thula*), a state species of special concern; black skimmer (*Rhynchos niger*), a state species of special concern; the least tern (*Sterna antillarum*), state listed as threatened; the tricolor heron (*Egretta tricolor*), a state species of special concern; and the white ibis (*Eudocimus albus*), a state species of special concern.

### 3.4.11 Invasive Nonnative Species

Invasive nonnative species include plants, animals, insects, or other organisms that are not native to an area and that threaten the natural biodiversity and functioning of an ecosystem. The introduction and spread of nonnative invasive species may also create significant, negative issues for military training or for other anthropogenic land uses.

#### Invasive Nonnative Plant Species

Invasive nonnative plant species have been documented at multiple locations on SRI. These species have the potential to outcompete and overtake native plant communities, degrade threatened and endangered species habitat, and alter natural processes such as the hydrology of wetlands. The following are invasive nonnative plant species documented on SRI.

##### Chinese Tallow

Eglin first identified Chinese tallow colonization on SRI in 1996 during the assessment of impacts from Hurricane Opal. Chinese tallow (*Sapium sebiferum*) is a small- to medium-sized tree that can take over large areas of natural habitat by forming thick dense stands and outcompeting native vegetation. Chinese tallow spreads rapidly, and dense stands can become established across open areas. Seeds are transported by birds or water, which makes their dispersal very difficult to control. Control efforts by hand removal (pulling seedlings) began in 1997–1998, and it soon was apparent that herbicide treatments would be required.

##### Cogon Grass

On SRI, cogon grass has been documented at multiple locations with most occurrences linked to test areas or road maintenance activities. Cogon grass (*Imperata cylindrica*) is an upland weed, but it also occurs in places that become briefly flooded. Because of its extreme invasiveness and its ability to rapidly cover large areas, it is considered one of the world's 10 worst weeds. Cogon grass has a fibrous root system composed of underground stems (rhizomes) that form dense mats that exclude most other vegetation. Cogon grass spreads by seeds, vegetative reproduction of rhizomes, and the movement of seeds/rhizomes by road maintenance/construction vehicles and activities. Control operations on SRI have been conducted since 1995 and continue as required.

##### Torpedo Grass

Torpedo grass has been found on SRI. Torpedo grass (*Panicum repens*) is a perennial grass that frequently forms dense colonies and has long, creeping underground rhizomes. It thrives in moist, often sandy soil along beaches and dunes, margins of lagoons, marshy shorelines of lakes and ponds, drainage ditches and canals.

However, it also does well in heavier upland soils. Its rhizomes or runners often extend several feet out into the water, and the plant frequently forms dense floating mats. Where torpedo grass forms dense stands, it rapidly outcompetes surrounding native vegetation. To date, no herbicide treatments have been conducted on this species.

## Purple Sesban

Purple sesban, or rattlebox, (*Sesbania punicea*) has been found on SRI. Rattlebox is a small exotic tree that reaches heights up to 1.82 to 2.44 m (6 to 8 ft) and can form dense thickets. To date, no treatments have been conducted on this species, although there are plans for treatment in the future.

## Other Species

There are additional invasive nonnative plant species that have been found on SRI but are not yet considered to be major problem species. Among those species are lantana (*Lantana camara*), mimosa (*Albizia julibrissin*), silverthorn (*Elaeagnus pungens*), natal grass (*Rhynchospora repens*), Chinese wisteria (*Wisteria sinensis*), asparagus fern (*Asparagus densiflorus*), and alligator weed (*Alternanthera philoxeroides*). The 96 CEG/CEVSN will be closely watching these species to ensure they do not spread, treating them where necessary.

## Nonnative Animal Species

The effects of nonnative animal and insect species on EBR have been documented. Nonnative animals prey on many rare and sensitive species, compete with native species for resources, and can carry rabies and other infectious diseases that may infect native wildlife. Coyotes, red fox, feral cats, fire ants, and cactus moths are nonnative invasive animal species known to inhabit SRI.

### Feral Cats

Feral cats are a major predator on native wildlife species. Over time, and with the assistance of humans, feral cats have become established on SRI. Feral cats hunt nesting shorebirds (least tern, black skimmer, and snowy plover), Santa Rosa beach mice, and other birds and wildlife. Feral cats have also been documented to prey on sea turtle nestlings at other locations. Due to recent feral cat control efforts, feral cat numbers appear to be stable on SRI but will require continued control efforts to maintain or lower the current population.

### Coyote

The coyote has expanded its range into the southeastern United States and is considered nonnative to northwest Florida coastal areas by the USFWS and the FWC. It competes with the native gray fox and the introduced red fox and hybridizes with the red wolf now extirpated from Florida. The coyote's presence precludes future reintroduction of the endangered red wolf in these areas (FNAI, 1994). Coyotes are especially problematic on the barrier island, where they prey on sea turtle nests and other sensitive species.

### Red Fox

The red fox is an introduced species and is considered by the USFWS and the FWC to be nonnative to the coastal areas of northwest Florida. It competes with the native grey fox and other native species. As with the coyote, the red fox has been problematic on the barrier island where it preys on sea turtle nests and other sensitive species.

## Fire Ants

Fire ants are found in open, disturbed areas, especially those that are wet. They are a threat to native wildlife populations, especially arthropods and reptiles, including their eggs. For instance, fire ants can infest sea turtle nests and significantly reduce future sea turtle populations. Fire ant predation of sea turtle nests on Eglin AFB barrier island property has not been documented. There is no documentation on the impacts fire ants have had on other sensitive species on Eglin property.

## Cactus Moth

A relatively new invasive species in the Florida panhandle, the cactus moth (*Cactoblastis cactorum*), has been found at the guard gate on SRI and is of concern because it predaes on native cacti. The late instar caterpillars eat any prickly pear cactus with flat pads.

## 3.5 SOCIOECONOMIC RESOURCES

### 3.5.1 Definition of the Affected Resource

The following resources are addressed under socioeconomics: recreational fishing, commercial fishing, and commercial shipping. Tourism is not considered within this resource analysis. Although the coastal zone of the northern Gulf is one of the major tourist and recreational regions of the United States, no terrestrial tourist activity takes place in the vicinity of the projected area due to restricted access on Air Force property.

### 3.5.2 Existing Condition

#### Recreational Fishing

Pleasure boats make up the vast majority of all registered boats, with concentrations of 75.5 registered boats per 1,000 residents in Escambia County, 126.9 registered boats per 1,000 residents in Okaloosa County, and 122.5 registered boats per 1,000 residents in Santa Rosa County. This compares to the Florida per-county average of 69.8 registered boats per 1,000 residents. Almost 50,000 private boat owners were identified in Escambia, Okaloosa, and Santa Rosa Counties as of 2000 (Teasly, 2001).

In 2000, Gulf states (excluding Texas) supported more than 40 percent of the nation's marine recreational fishing. Recreational fisherman harvested 104,000 pounds of fish in this area in 2000 (Gulf Base, 2007). Nearly 105 million of the fish were caught from either inland waters (65 percent) or from state territorial seas (25 percent) (NMFS, 2007).

In the Gulf, recreational fishing activities typically occur within 4.8 km (3 mi) of the shoreline, with anglers fishing from shore or from private or charter boats. Recreational fishing activities also include fishing from charter boats that go into deep water. Party boats fish primarily over offshore hardbottom areas, wrecks, or artificial reefs for amberjack, barracuda, grouper, snapper, grunts, porgies, and sea bass.

Fishing tournaments and recreational fishing make a sizeable contribution to the Florida economy in general and particularly to the local economies of various communities, including those in the panhandle. Tournaments not only bring in direct revenue from the participants, but they also generate income for local businesses as well (Teasly, 2001).

### **Commercial Fishing**

The Gulf of Mexico is an important commercial fishing area in the United States and among the most productive in the world (Gulf Base, 2007). Commercial fishing in the Gulf in 2004 produced fish harvests valued at over \$519 million (NMFS, 2007a). Florida's west coast ranked second among the Gulf states of Louisiana, Mississippi, and Alabama, with over 38 million kilograms (84 million pounds) of domestic seafood landings in 2004 and 30.4 million kilograms (67 million pounds) in 2005 (NMFS, 2007). Apalachicola is the closest major commercial fishing port to the project area. Counties within and surrounding the project area, Okaloosa and Santa Rosa, contribute comparatively less in terms of commercial fish landings.

### **Commercial Shipping**

The Port of Pensacola (Escambia County) and the Port of Panama City (Bay County) are the closest commercial shipping ports to the Proposed Action. Approximately one-third of U.S. shipping tonnage passes through six deepwater Gulf ports. In 2005, more than 1.05 kilograms (116.1 million short tons) passed through the 1,785 km (1,109 mi) of the Gulf Intracoastal Waterway (GIWW), which runs through Santa Rosa Sound, which borders the north shore of SRI. The 2005 total represented a 5.9 percent decrease from 2004. The state of Florida ranks fourth as of 2005 in the amount of goods shipped via water, both from foreign and domestic sources, and a good portion of these goods pass through the Gulf portion of the GIWW (USACE, 2007).

## **3.6 SAFETY**

### **3.6.1 Definition of the Affected Resource**

The existing safety environment encompasses risk to public health and with respect to the Proposed Action, risk to the health of military personnel, and those measures designed to minimize that risk. For actions occurring on military property with inherent safety risks, procedures are in place that minimize or eliminate risks to the public altogether. Such measures include the designation of areas as "restricted" or "closed" to the public, either permanently or temporarily. Such closures are driven by the dimensions of the "safety footprint" of a particular action that may have potentially harmful noise, blasts, or other effects. The dangers associated with the Proposed Action involve the use of high-powered lasers.

### **3.6.2 Existing Condition**

#### **Test Area A-15**

Test Area A-15 is a military-controlled area in which the beaches are permanently closed to the public. The in-water areas of the Gulf of Mexico as well as Choctawhatchee Bay and Santa Rosa Sound that will be used as a target field will be temporarily closed to the public, and access will

be prevented by ground and marine spotters stationed around the perimeter during tests, so the area will be clear of commercial and recreational boaters, divers, and air traffic. Therefore, the primary safety concern is to military personnel involved in the tests. There is also potential for lasers to affect biological species occurring in the test area.

## Laser Hazards

Lasers emit beams of optical radiation in the ultraviolet, visible, and infrared spectrum. Lasers emit beams of optical radiation in the ultraviolet, visible, and infrared spectrum. Lasers emit light in a narrow, low-divergence beam and with a well-defined wavelength in contrast to a light source such as the incandescent light bulb, which emits into a large solid angle and over a wide spectrum of wavelength. The hazards most commonly associated with the operation of a powerful laser and direct contact with the beam is the potential for damage to the eye, burns to the skin, explosion from the presence of volatile chemicals, and fire from contact with flammable materials.

## Eye Hazards

Eye hazards can be either corneal or retinal burns (or both), depending on laser wavelength. Corneal or lenticular opacities (cataracts) or retinal injury may be possible from lengthy exposure to excessive levels of short wavelength light and ultraviolet radiation due to photochemical effect. Ocular hazards represent a potential for injury to several different structures of the eye. Ocular injury from heating is generally dependent on which structure absorbs the most radiant energy per volume of tissue. Photochemical injury also depends on the energy per photon of the energy absorbed (i.e., shorter wavelength radiant energy has more energetic photons). Retinal effects are possible when the laser emission wavelength occurs in the visible and near-infrared spectral regions, that is, 400 to 1,400 nanometers (nm). The light directly from the laser or from a specular (mirror-like) reflection entering the eye at these wavelengths can be focused to an extremely small image on the retina. The incidental corneal irradiance (or radiant exposure) will be increased approximately 100,000 times at the retina due to the focusing effects of the cornea and lens. Laser emissions in the ultraviolet and far-infrared spectral regions (outside 400 to 1,400 nm) produce ocular effects primarily at the cornea. However, laser radiation at certain wavelengths may reach the lens and cause damage to that structure.

Radiation at visible wavelengths, 400 to 700 nm, and near-infrared wavelengths, 700 to 1,400 nm, is transmitted through the ocular media with little loss of intensity and is focused to a spot on the retina 10 to 20 micrometers in diameter. Such focusing can cause intensities high enough to damage the retina. For this reason, laser radiation in the 400- to 1,400-nm range is termed the *retinal hazard region*. Wavelengths between 400 and 550 nm are particularly hazardous for long-term retinal exposures, that is, exposures lasting for minutes or even hours. This photochemical effect is sometimes referred to as the blue light hazard.

## Skin Hazards

Skin hazards are the potential to burn the skin from acute exposure to high levels of optical radiation. At some specific ultraviolet wavelengths, skin carcinogenesis may occur. Photosensitive reactions are possible in the 400- to 600-nm (visible) wavelength region.

## Laser Classification

The basic approach of virtually all laser safety standards has been to classify lasers by their hazard potential, which is based on their optical emission. The next step is to specify control measures that are commensurate with the relative hazard classification. Therefore, a laser is classified based on the hazard it presents, and for each classification, a standard set of control measures applies.

This philosophy has given rise to a number of specific classification schemes such as the one employed in the American National Standards Institute (ANSI) Z136.1-2000 American National Standard for Safe Use of Lasers. The ANSI scheme has four hazard classifications that apply to the laser alone or to the laser system. The classification is based upon the beam output power or energy per pulse for pulsed lasers. The classification scheme is used to describe the capability of the laser or laser system to produce injury to personnel. The classifications for lasers are as follows: I, II, III (IIIa, IIIb) and IV, where higher class numbers indicate a greater potential hazard.

## 3.7 CULTURAL RESOURCES

### 3.7.1 Definition of the Affected Resource

As defined under 32 CFR Part 800 (l)(1), “Historic Property means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria.”

As a federal agency, Eglin AFB is legally required to consider the effects its actions may have on historic properties. These requirements are considered under Air Force Instruction (AFI) 32-7065 (U.S. Air Force, 2004a). Mandating federal regulations are the Antiquities Act of 1906, the Historic Sites Act of 1935, NEPA of 1969, the National Historic Preservation Act (NHPA) of 1966 as amended, 36 CFR Part 800, the Archaeological and Historic Preservation Act of 1974, the Archaeological Resources Protection Act of 1979, the Native American Graves Protection and Repatriation Act of 1990, and the American Indian Religious Freedom Act. The act that is most directly influences cultural resources management at Eglin is the NHPA (U.S. Air Force, 2004a).

The NHPA of 1966 was enacted to set federal policy for managing and protecting significant historic properties. Federal agencies must identify historic properties and consult with the Advisory Council on Historic Preservation and SHPO (U.S. Air Force, 2004a). Section 106 of

the NHPA requires that federal agencies analyze the impacts of federal activities on historic properties, or cultural resources included in, or eligible for inclusion in, the National Register of Historic Places (NRHP). Section 110 of the NHPA requires that federal agencies inventory any cultural resources that are located on their property or within their control and to nominate those found to be significant for inclusion on the National Register.

Section 3.7.2 describes known cultural resources within the project area considered significant and, as such, eligible for the National Register. This includes any archaeological resources that are considered eligible or currently listed on the National Register. This may also include historic structures, historic districts, historic cemeteries, or traditional cultural properties.

In accordance with AFI 32-7065, the specific locations of historically significant sites cannot be identified in public documents so that these sites are not impacted by vandalism or theft. This specific information is sensitive and can be acquired from Eglin's Cultural Resources office (96 Civil Engineer Group, Environmental Management Division, Cultural Resources Branch [96 CEG/CEVH]) as required.

### **3.7.2 Existing Condition**

The entire terrestrial project area has previously been surveyed for cultural resource presence/absence. Due to this survey work, the locations of cultural resources are well known on SRI. Eglin is currently finalizing a cultural resource assessment of both Okaloosa and Santa Rosa Islands to determine the status of previously documented sites after active hurricane seasons in 2004 and 2005.

One hundred and eighty-two identified cultural resources are located on SRI within Eglin AFB controlled areas. Eglin AFB controls this entire area ( $19.26 \text{ km}^2$  [4,760 acres]), which has been formally surveyed for cultural resources. As a result, no additional archaeological reconnaissance survey would be required. However, areas that do contain known resources that are listed on the NRHP, or eligible or potentially eligible for listing, would need to be considered for impacts when located in areas that intersect with the Proposed Action. Within the vicinity of the project area are two archaeological sites 8SR1670, and 8SR345 (Table 3-8). Both sites are considered ineligible for listing on the NRHP.

**Table 3-8. Archaeological Sites Located in the Vicinity of the Project Area**

Site Number	Site Type	Site Condition	NRHP Status
8SR00345	Historic Isolate	Unknown	Ineligible
8SR01670	Mid 20 <sup>th</sup> Century Historic Component	Minor damage	Ineligible

NRHP=National Register of Historic Places

The 22 historic buildings and structures described in cultural resource data files for Test Area A-15 consist entirely of Cold War period construction (1946–1989). Many of these structures were constructed in support of the Boeing and Michigan Aeronautical Research Center's (BOMARC's) missile program and are part of the BOMARC A-15 Historic District. Of the remaining 22 buildings within the district, 22 are considered eligible for listing on the NRHP as a contributing member of the historic district, and 21 are considered eligible for listing on the NRHP as a sole nomination (Table 3-9).

**Table 3-9. Eligible Historic Structures Recorded Within Project Area**

<b>Site Number</b>	<b>Site Name</b>	<b>NRHP Status</b>	<b>Test Area</b>	<b>Year Built</b>	<b>Comment</b>
Building # 11097	Helicopter Pad	Eligible	A-15	1958	Building is eligible for sole nomination to the NRHP and is considered a contributing member to a possible district.
Building # 12503	Potable Water Supply	Eligible	A-15	1960	Building is eligible for sole nomination to the NRHP and is considered a contributing member to a possible district.
Building # 12508	Utility Vault/ Cable Junction House	Eligible	A-15	1958	Building is eligible for sole nomination to the NRHP and is considered a contributing member to a possible district.
Building # 12510	Armament Research Test Facility/ CFD Building	Eligible	A-15	1960	Building is eligible for sole nomination to the NRHP and is considered a contributing member to a possible district.
Building # 12511	Water Storage Tank	Eligible	A-15	1958	Building is eligible for sole nomination to the NRHP and is considered a contributing member to a possible district.
Building # 12514	Missile Launch Control/ Interceptor Missile Squadron Operations	Eligible	A-15	1959	Building is eligible for sole nomination to the NRHP and is considered a contributing member to a possible district.
Building # 12515	Fire Station	Eligible	A-15	1958	Building is eligible for sole nomination to the NRHP and is considered a contributing member to a possible district.
Building # 12516	Water Supply Building/ Engineering Storage Facility	Eligible	A-15	1958	Building is eligible for sole nomination to the NRHP and is considered a contributing member to a possible district.
Building # 12519	Missile and Space Research and Testing Facility/ Temporary Office and Storage	Eligible	A-15	1960	Building is eligible for sole nomination to the NRHP and is considered a contributing member to a possible district.
Building # 12521	Missile and Space Research and Testing Facility/ Assembly and Maintenance Shop	Eligible	A-15	1960	Building is eligible for sole nomination to the NRHP and is considered a contributing member to a possible district.
Building # 12522	Missile and Space Research and Testing Facility/ General Purpose Building	Eligible	A-15	1960	Building is eligible for sole nomination to the NRHP and is considered a contributing member to a possible district.
Building # 12525	Liquid Fuel Unloading Pier	Eligible	A-15	1958	Structure is eligible for nomination to the NRHP on its own merit and is considered a contributing member to a possible district.

**Table 3-9. Eligible Historic Structures Recorded Within Project Area, Cont'd**

<b>Site Number</b>	<b>Site Name</b>	<b>NRHP Status</b>	<b>Test Area</b>	<b>Year Built</b>	<b>Comment</b>
Building # 12528	Missile Launch Control/ Operations Center	Eligible	A-15	1958	Building is eligible for sole nomination to the NRHP and is considered a contributing member to a possible district.
Building # 12548	Electrical Transformer Substation	Eligible	A-15	1959	Structure is eligible for nomination to the NRHP on its own merit and is considered a contributing member to a possible district.
Building # 12549	Research Equipment Storage Facility/ Sandia Building	Eligible	A-15	1959	Building is eligible for sole nomination to the NRHP and is considered a contributing member to a possible district.
Building # 12550	Missile and Space Research and Testing Facility/ Bunker #8	Eligible	A-15	1959	Building is eligible for sole nomination to the NRHP and is considered a contributing member to a possible district.
Building # 12551	Launch Area Support Building	Eligible	A-15	1959	Building is eligible for sole nomination to the NRHP and is considered a contributing member to a possible district.
Building # 12552	Missile and Space Research and Testing Facility/ Cable Shelter	Eligible	A-15	1959	Building is eligible for sole nomination to the NRHP and is considered a contributing member to a possible district.
Building # 12556	Model V Shelter	Eligible	A-15	1960	Building is eligible for sole nomination to the NRHP and is considered a contributing member to a possible district.
Building # 12558	Model V Shelter	Eligible	A-15	1960	Building is eligible for sole nomination to the NRHP and is considered a contributing member to a possible district.
Building # 12576	Industrial Waste Treatment and Disposal Facility/ Chemical Spill Station	Eligible	A-15	1958	Building is eligible for sole nomination to the NRHP and is considered a contributing member to a possible district.
Building # 12588	Munitions Storage Igloo/ Warhead Storage	Ineligible	A-15	1960	Building is ineligible for sole nomination to the NRHP and is considered a contributing member to a possible district.

NRHP=National Register of Historic Places

## Marine Cultural Resources

The protection of Gulf submerged traditional cultural properties falls under state jurisdiction, 9 NM into the Gulf, and federal jurisdiction from 9 to 12 NM and at the mean high water mark on land. The possibility exists that within this area, submerged prehistoric sites and historic resources such as shipwrecks could exist. The shoreline and offshore area is under the jurisdiction of the U.S. Department of the Interior (DOI). Eglin Cultural Resources Branch coordinates Section 106 of the NHPA with the Florida SHPO and other agencies as appropriate.

There are three main acts that address submerged cultural resources: the NHPA, the Abandoned Shipwreck Act, and the Florida Historical Resources Act (FHRA). Section 106 of the NHPA, 1966, as amended, applies to submerged as well as terrestrial cultural resources. Section 106 requires all federal agencies to identify any historic properties that any undertaking has the potential to affect and seek ways to avoid or minimize any adverse effects on these historic properties. Furthermore, eligibility for listing on the NRHP must be determined. The Exclusive Economic Zone (EEZ) extends 200 NM from the shoreline and is under the jurisdiction of the DOI. The Abandoned Shipwreck Act of 1987 gives the title and jurisdiction over historic shipwrecks to the federal government extending to the EEZ. This applies even if the ship is within state waters. Before engaging in an activity that may negatively affect a shipwreck, this Act requires consideration of the effect the activity may have, often mandating preservation. The FHRA protects sites on state-owned land and submerged land within the Gulf. Any excavation or disturbance of a site requires a permit or contract from the Division of Historical Resources, Bureau of Archaeological Research (U.S. Air Force, 2005).

The Historic Preservation Plan for Eglin AFB contains no guidance regarding the management of the resources within the over-water ranges; however, Eglin Cultural Resources is responsible for identifying resources and impacts within the 19.31-km (12-mi) offshore area as per NHPA Section 106 procedures, with added emphasis on the protection of submerged resources through avoidance. For portions situated outside state waters, the Minerals Management Service/Outer Continental Shelf, DOI-developed *Handbook for Archaeological Resource Protection* contains prehistoric and historic high-probability zones and guidelines for the identification of submerged cultural resources. These guidelines specify the investigation techniques required to identify potential historic and prehistoric resources in the high-probability zones (U.S. Air Force, 1996).

No cultural resources have been identified within the offshore project area. However, Eglin Cultural Resources Branch has previously documented underwater sites in other areas along SRI, and until a formal survey of this area occurs, encountering undocumented underwater resources remain a possibility.

## 4. ENVIRONMENTAL CONSEQUENCES

### 4.1 SOILS

This section evaluates the potential effects of the Proposed Action and alternative actions to soils.

#### 4.1.1 Proposed Action (Preferred Alternative)

Obstacle placement on the land and within the water will require the limited disturbance of the sand on SRI, in addition to specific areas of offshore sediments. In order to place and remove obstacles, sands and sediments in this location would be excavated or shifted by various hand and mechanical methods. Since the nearshore bottom topography is a relatively flat, sandy area with no apparent outcrops, and the disturbance from obstacle placement and removal would be limited in area affected, the Air Force does not expect this action to dramatically alter bottom topography. Section 4.2 further examines issues of turbidity resulting from the Proposed Action.

#### 4.1.2 Alternative 1

As with the Proposed Action, obstacle placement on the land and within the water will require the limited disturbance of the sand on SRI, in addition to specific areas of offshore sediments. Accordingly, impacts under Alternative 1 would be identical to those presented under the Proposed Action (Preferred Alternative).

#### 4.1.3 No Action Alternative

There would be no impact to soils under the No Action Alternative. The ALRT testing program would continue with the current target layout that no longer meets the needs of the program.

### 4.2 WATER RESOURCES

#### 4.2.1 Proposed Action (Preferred Alternative)

Placement and removal of mines, obstacles, and barriers in the water would disturb bottom sediments, causing increases in turbidity. Personnel would position these obstacles or barricades near the edge of the water or in the water up to 4 m (13.12 ft) deep and anchor them with screw anchors or poles jetted into the sand. A boat/barge with equipment would raise and lower some of the heavier targets; a scuba diver would secure each one with a screw anchor.

Turbidity increases during the placement and removal of the targets and obstacles would be small and localized. Jetting would create more turbidity, but it would still be localized and temporary. Additionally, the target field sites are in high energy areas already subject to tides and wave action.

Wetlands and floodplains are scattered throughout the Test Area A-15 vicinity. Establishment of target fields would involve some digging to bury the mines, which could impact water quality

and hydrology. However, the mission would not place target fields in wetlands and would minimize ground-disturbing activities in floodplains. Areas devoid of vegetation present the most suitable environment for the ALRT mission. As a result, forested areas, herbaceous wetlands, and sea grass beds will be avoided. Minor digging to bury mines (5.8 to 10.16 cm [2 to 4 inches]) would occur in the 100-year floodplain, but missions would be infrequent (four per year) and of short duration (one to two weeks), and all holes would be refilled after mine removal.

Negative impacts to water resources are not anticipated from the Proposed Action ALRT activities.

#### **4.2.2 Alternative 1**

Alternative 1 would eliminate the placement of structural sea urchins and concertina wire or simulated concertina wire in the water, thereby reducing the potential for turbidity. Negative impacts to water resources are not anticipated from Alternative 1 ALRT activities.

#### **4.2.3 No Action Alternative**

Under the No Action Alternative, the current mission would continue and no negative impacts to water resources would be expected.

### **4.3 NOISE**

#### **Noise Effects**

Effects on the physical environment are not anticipated from the noise generated by the ALRT tests at the affected areas in the Gulf of Mexico or Santa Rosa Sound. Because the mines and associated instrumentation would be inert, they contain no explosive material. There would be no explosive noise associated with the mission. There are no acoustic properties associated with the ALRT laser transmission. The noise generated by the flight of the helicopter over the test area would be the primary noise influence during testing activities. Helicopter noise would not have a significant effect on the physical environment. The impact on biological resources from the noise generated by the helicopter is analyzed in Section 4.4.1.

#### **4.3.1 Proposed Action (Preferred Alternative)**

##### **Helicopter Noise in Air**

Helicopter noise would be most noticeable to persons onshore or in nearshore Gulf waters. The sound exposure levels in Table 4-1 for an HH-53 represent typical noise that would be produced out to several distances. It should be noted that during hot weather, helicopters require more energy to stay aloft and produce more noise as a result, but humidity may have a dampening effect on sound. Cold weather may cause sound to travel farther than it would during warm weather. The HH-53 data is used to provide a conservative estimate, because the Bell UH-1 "Huey," which would be the standard airframe for this test generates less noise than the larger, more powerful HH-53.

**Table 4-1. HH-53 Sound Exposure Levels**

<b>Distance (feet)</b>	<b>Sound Exposure Level<sup>1</sup></b>
<b>200</b>	<b>101.4</b>
250	99.9
315	98.4
400	96.8
<b>500 Threshold</b>	<b>95.2 Threshold</b>
630	93.6
800	91.9
1,000	90.2
1,250	88.4
1,600	86.6
2,000	84.7
2,500	82.8
3,150	80.7
4,000	78.6
5,000	76.4
6,300	74.0
8,000	71.5
10,000	68.8
12,500	66.0
16,000	63.0
20,000	59.9
25,000	56.4

Source: U.S. Air Force, 1996

1. dBA based on 100 percent RPM, at 59 °F, 70 percent relative humidity

### Potential Impact of Helicopter Noise to the Public

At a distance of 152 m (500 ft), noise would not exceed 95 A-weighted sound exposure level (ASEL). No single noise exposure from low-level helicopter operations should result in annoyance to the public, given that the distance between SRI and the mainland shoreline exceeds 305 m (1,000 ft). As a result, the public would not be exposed to noise greater than 95 ASEL from helicopters landing at Test Area A-15 for refueling. Other vessels should not be exposed to noise of 95 ASEL, since training is not conducted until the surrounding areas are clear of nonparticipating vessels and aircraft.

During the test sorties, aircraft would maintain an altitude of 152 to 91 m (500 to 3000 ft). Since there are no affects at 152 m (500 ft) and noise would dissipate even further at higher altitudes, there would be no effects on ground crews. Again, the public would be excluded from the test area, so noise level would be diminished further before reaching the public. No adverse affects from noise would occur.

#### 4.3.2 Alternative 1

Alternative 1 would utilize the same aircraft and procedures and occur in the same area as the Proposed Action. Therefore, there would be no impacts from noise to the environment.

### 4.3.3 No Action Alternative

Under the No Action Alternative, the ongoing missions would continue with no changes as discussed in the Proposed and Alternative Actions. As a result, the noise environment would remain at ambient or background levels.

## 4.4 BIOLOGICAL RESOURCES

### 4.4.1 Proposed Action (Preferred Alternative)

#### Aircraft Use

##### *Flora and Fauna*

The primary area of concern for potential aircraft impacts to flora and fauna would be noise, especially during landings and take-offs from Test Area A-15. Because Test Area A-15 is an established HLZ, impacts to surrounding vegetation from sandblast were discounted. No data were available concerning the impacts of noise overpressures on plants. It is estimated, however, that impacts to plants from sound overpressures may occur at 201 dB<sub>P</sub> (peak unweighted decibels) and greater, potentially causing rupture of the plant cells and subsequent death of the plant. Because sound overpressures from mission activities would not reach levels greater than 201 dB<sub>P</sub>, no impacts to plants from noise are anticipated. As a result, plant species are excluded from noise impacts analysis.

The effects of noise on wildlife are unclear. Noise above 140 dB<sub>P</sub> may cause hearing damage in humans and could possibly have similar effects on wildlife. Although safety procedures prevent the exposure of people to such levels, wildlife within this area could be exposed. Certain management requirements that can be employed to help minimize wildlife exposure to potentially harmful noise levels are described below. Impacts to threatened, endangered, or other protected species are discussed further below.

Certain management requirements that can be employed to help minimize wildlife exposure to potentially harmful noise levels are described below. Impacts to sensitive species are discussed further below. With the implementation of these management requirements, impacts to flora and fauna from aircraft use are not anticipated.

##### *Sensitive Species*

###### *Sea Turtles*

During sea turtle season, the three sensitive turtle species occurring on SRI (Atlantic green sea turtle, loggerhead turtle, and leatherback turtle) could also be annoyed by elevated sound pressure levels. Although sound pressure levels of 115 dB<sub>P</sub> would not likely reach the beach during any mission activities, some elevated levels may reach the beach area; therefore, night testing should be minimized during sea turtle season (May through October). Sea turtles may be vulnerable to underwater noise; thus noise impact analyses were conducted for these species.

Prior to each of the daytime missions, clearance of marine species should be conducted to minimize impacts. Additionally, if any or all of these activities occur outside of the peak nesting periods, the rate of deterrence would be further reduced.

### *Piping Plover*

None of the test flights would occur over piping plover critical habitat, and the Test Area A-15 HLZ is located over 4.8 km (3 mi) from the critical habitat area. Piping plovers may occur outside of the critical habitat area, and these birds could be flushed if startled by noise from aircraft. However, due to the short duration of the test events, it is likely that the piping plover would return to the area soon after the incident. Impacts to the piping plover are not anticipated from aircraft use.

### *Santa Rosa Beach Mouse*

It is unlikely that the ALRT activities on SRI would impact the Santa Rosa beach mouse. Foraging behavior at night may be temporarily disrupted during night testing activities, however, it is likely that foraging would resume after activities associated with the data collection flight concluded. Impacts to the Santa Rosa beach mouse are not anticipated from aircraft use.

### *Shorebirds and Wading Birds*

Flight responses have been noted in sea birds exposed to aircraft noise greater than 85 dBA. Startle effects increase when the noise occurs simultaneously with a visual presence, such as a low-flying aircraft. Therefore, those species within sight of an aircraft have the greatest chance of being startled. Shorebird species that are in the early stages of nest building and egg laying and chicks in the early fledgling stages could be affected to the greatest degree, since unattended eggs and young could be exposed to increased predation and weather. However, given the short duration of the mission noise sources, most birds would likely return to their nests quickly. It would be preferable to avoid known shorebird nesting and feeding areas during nesting season (1 March to 31 August) to minimize negative impacts to eggs and chicks.

## Laser Use

### *Terrestrial Species*

Like marine mammals (described below), most terrestrial vertebrates have developed a *tapetum lucidum* for enhancing night vision. Thus, they too are less susceptible to laser impacts than humans.

Additionally, in order to suffer eye damage, an animal would have to be inside the laser swath width and looking directly into the laser radiation source. This scenario is not likely. Because of the speed of the aircraft, the laser's area of irradiation would move rather quickly over the beach. The target field is only 100 m (328 ft) wide and the laser would only be actively operated over a 100-m (328-ft) stretch of beach plus a small buffer (approximately 100 m) on each side. This further reduces the likelihood that a sensitive species would be within the path of the laser and

looking directly into the exit port, simply because the test area encompasses only a very small portion of a large beach. The presence of ground personnel in support of the ALRT testing would also contribute to keeping terrestrial species out of the test area.

If a protected species such as a sea turtle were to enter the area, the test would terminate immediately. Observers on the ground as well as the pilot and copilot would actively survey for the presence of turtles on the beach and would communicate with the laser operator to ensure a rapid response in the event of a turtle sighting.

### ***Marine Species***

This section addresses possible harassment of marine animals by laser effects that have propagated from the source to the air-sea interface and into the water. The Proposed Action involves detection of various submerged and surface targets in water and on the beach using ALDAI-W and ROAR laser systems. The operating parameters and potential hazards are listed in Tables 2-1 to 2-4. Since the attenuation of light energy in water is high, the energy density of a laser beam decreases rapidly once it enters the water column. Because of this rapid decrease in energy, no damage to the eyes of marine organisms in the water column would be expected and potential effects from the ALRT laser would focus on cetaceans at the surface where the potential for damage is greatest.

Zorn et al. (2000) suggest that oceanographic Light Detection and Ranging (LIDAR) systems that meet current human safety standards are not likely to impact cetaceans. Cetaceans have adapted to living in bright sunlight and dark ocean waters. In bright light a highly constricted pupil keeps the incoming energy levels down, while in darker conditions, a pupil can be fully opened to admit as much light as possible. Cetaceans have developed the *tapetum lucidum* to function as a light-gathering device within the eye, which indicates the homogeneity of the ocean environment. Zorn et al. (2000) suggest cetaceans may have a higher damage threshold than humans because of the existence of the *tapetum lucidum*.

The Environmental Technology Laboratory of NOAA has investigated the potential hazard of LIDAR to marine mammals (including 13 species of cetaceans and pinnipeds). This investigation revealed that the marine mammal species are considerably less sensitive to laser illumination than humans. This suggests that oceanographic LIDAR that meet current human safety standards are not likely to impact cetaceans. Other marine creatures are expected to be even less sensitive to LIDAR than marine mammals, given the physiological construction of their visual systems. Marine mammals have been estimated as having a higher laser damage threshold compared to humans (Zorn et al., 2000). Further, to suffer injury a marine mammal must be inside the laser swath width and looking directly into the laser exit port. The likelihood that this situation would occur is low. Lasers would only be operated within the 3,000-square-meter ( $m^2$ ) (32,291-ft $^2$ ) area in the Gulf and only momentary (i.e., a fraction of a second) illumination would occur at any given place within the test area.

Certain requirements would be included as part of the Proposed Action that would further decrease the probability for impacts. The pilot, copilot, and the console operator would terminate the laser output instantly should a protected marine species be spotted. Marine

mammals usually occur in groups. Large groups of cetaceans are more visible when at the surface and would be easily tracked during aerial and shipboard surveys and avoided. Survey lights from the aerial and shipboard viewing platforms would emit little light during night missions to clear the area so nighttime surveys are inherently weak. The low altitude and slow aircraft speeds during tests allow for greater ability for the pilot and copilot to survey for marine mammals in the vicinity during day missions.

Due to slower aircraft speeds that provide additional search time and improved surveying capabilities and the unlikely event that a marine animal would be looking directly into the laser exit port, the ALDAI-W and ROAR laser systems to be used in the ALRT mission tests are unlikely to impact marine animals.

## Target Fields and Safety Surveys

### *Flora and Fauna*

The potential impacts from the target fields would be noise, direct physical impacts (vehicle/equipment collision, foot trampling), and habitat alteration, primarily during setup and removal activities. Most activities would be seaward of the dunes on the beach and in the surf zone, areas that do not have any vegetation. If activities were to require movement near vegetated areas, no equipment or vehicle use would occur on or within dune habitat and no project participants would traverse dunes, vegetated or unvegetated, that are 1.5 m (5 ft) or higher. Impacts to vegetation are not anticipated.

Barges and other vessels would be used during setup, takedown, and maintenance activities. Cavitation from propeller blades may potentially be a source of underwater noise. Because recreational and commercial boat traffic is common in the Gulf of Mexico and Santa Rosa Sound, the utilization of barges to place the inert mines and other targets in the water would not generate significant noise to make an impact, compared to the existing background noise from other boat traffic. Furthermore, the duration of these setup and takedown events would be minimal. Thus, impacts to marine species from noise associated with setup and removal activities are not anticipated.

Vehicle movements and foot traffic would contribute to the potential for collisions and trampling. Most movements would occur on established roads and paths during daylight hours, primarily during setup and removal activities. The noise from general setup/removal activities would likely cause most wildlife to temporarily leave the area, minimizing the chance for direct physical impacts. Entanglement is possible, but few animals large enough to get ensnared (other than sea turtles, which are covered below) would be present on the beach. In the water, there is potential for entanglement in concertina wire rolls and structural sea urchins. Few other surf zone species (other than sea turtles, Gulf sturgeon, and marine mammals, which are covered below) are large enough to get entangled in these barriers; most would either avoid the area or swim around them. During setup and removal activities, barges are slow-moving, allowing animals time to move away. Similar to land-based activities, general noise from setup/removal activities would likely cause most animals to temporarily move to another area, so the potential for direct impacts from in-water activities such as anchor placement is small.

The habitats of the target areas would be altered during ALRT activities. However, after two weeks the targets would all be removed, allowing the areas to return to their natural state. Personnel would refill all holes and otherwise return the area to the condition it was in prior to ALRT activities. Currents in the Sound and Gulf would quickly erase any changes to the bottom habitats. Impacts to flora and fauna (other than sensitive species covered below) are not anticipated from target area activities.

### **Sensitive Habitats**

#### *Piping Plover Critical Habitat*

The preservation of critical habitat in wintering areas is important to the survival of piping plover populations. Quality winter foraging and roosting is necessary if adults are to survive, migrate back to breeding sites, and nest successfully (USFWS, 2001). Within property administered by Eglin, critical habitat is situated on the north shore of SRI approximately 4.8 km (3 mi) west of Test Area A-15. ALRT test activities would not occur in or near piping plover critical habitat. The critical habitat has been re-marked since Hurricane Ivan and is clearly visible. Although the Proposed Action would not involve activities within or near critical habitat, personnel would be instructed to stay out of the critical habitat. Mines, obstacles, and barricades are not expected to pose a threat to critical habitat. Activities would not occur in or near designated critical habitat, therefore the Proposed Action is **not likely to adversely modify** designated piping plover critical habitat on SRI.

#### *Gulf Sturgeon Critical Habitat*

It is probable that the substrate in the vicinity of the Proposed Action supports at least some prey items preferred by subadult and adult Gulf sturgeons (i.e., mole crabs, sand fleas, various amphipod species, and lancelets). However, the occurrence of these species at the proposed site would be incidental. Due to the short nature of this mission, loss of benthic prey species as a result of ALRT activities would be small and temporary, and recolonization would be expected within a short time.

The placement and removal of the mines and obstacles (either anchored to screw anchors or to poles jetted into the sand) on the Gulf of Mexico floor would result in turbidity due to the disturbance of bottom sediments. However, the disturbance would be local and temporary, and would not result in significant or long-term effects to the water column.

As discussed in Section 4.2, sediment would be displaced by insertion of the mines and obstacles. However, the amount of sediment impacted would be small compared to the amount of comparable habitat available in the nearby area and in the Gulf of Mexico overall. The Proposed Action would not change the composition, characteristics or functions of the sediment.

The mines and obstacles would be placed on the Gulf of Mexico floor in an area 100 m (328 ft) in length and no more than 30 m (98.4 ft) from the shoreline or 4-m depth. Such a configuration is not expected to affect the ability of Gulf sturgeon to migrate between riverine, estuarine, and marine habitats. The temporary placement of the devices associated with the Proposed Action would not significantly alter water flow or migratory behavior of the species.

The Proposed Action would not appreciably affect the availability of prey items, water quality, or habitat used by the Gulf sturgeon. Therefore, Eglin NRS believes the Proposed Action is **not likely to adversely modify** critical habitat for the Gulf sturgeon.

#### *Essential Fish Habitat*

The proposed ALRT testing would be designed and sited to avoid and minimize impacts to EFH and federally managed species. The test areas chosen for this mission would avoid sensitive habitats such as seagrass beds, oyster reefs, and hardbottom habitat. However, some unavoidable adverse impacts on EFH would occur. Placement of the mines and obstacles onto the bottom of the Gulf of Mexico and Santa Rosa Sound would temporarily affect the fine, medium-grained sand habitat, which may include EFH for some species. However, the area of sandy bottom affected by the proposed project is small compared to the area of other suitable habitats available to these species in the vicinity of the Proposed Action. These temporary disturbances may have indirect effects on federally managed species through the loss of benthic prey species found in the nonvegetated bottom habitats. Most of these prey species, however, are expected to recolonize the affected area.

Placement of the mines and obstacles either anchored to screw anchors or to poles jetted into the sand are likely to resuspend sediments, temporarily increasing turbidity in the water column. These elevated levels of suspended sediment could have adverse effects on federally managed fish species, including avoidance of the impact area, minor physiological effects (such as interference with respiratory functions), and indirect effects related to reduced light penetration into the water. The sediments suspended by the Proposed Action are expected to settle within or near the impact area shortly after ALRT testing is complete (one to two weeks), resulting in only minor, temporary impacts to EFH or federally managed species.

To alleviate any potential impacts to protected habitat, hardbottom habitats and artificial reefs would be avoided when placing the obstacles or barricades on the floor of the Gulf of Mexico. Hardbottom is rocky, limestone, or coral outcroppings that, though scattered, does exist within or near the affected environment. A shipwreck is located offshore east of Test Area A-15A. To alleviate any potential impacts to the shipwreck or artificial reefs, these areas would be avoided. The flexibility to choose discreet locations for the ALRT activities would ensure that these areas were easily avoided.

No seagrass beds or oyster beds are located in the proposed area of interest; however *Sargassum* mats may occur. Aggregations of the floating aquatic plant *Sargassum sp.* harbor a variety of marine life including sea turtles. *Sargassum* forms large drifting mats (sometimes miles long) and in the Gulf of Mexico provides practically the only near-surface habitat over large open waters. A variety of fish and invertebrate species inhabit *Sargassum* mats and large predatory fish (e.g., mahi) are consistently found near floating mats. ALRT testing would be delayed if large *Sargassum* mats were found in the testing area until the mat had passed beyond 200 m (656 ft) from the test area.

ALRT missions **are not likely to adversely modify** EFH.

### *Sensitive Species*

#### *Sea Turtles on the Beach*

The activities described under the Proposed Action have the potential to impact sea turtles. Impacts could include changes in the nesting behavior of adult female sea turtles, changes in the behavior of hatchling sea turtles as they emerge from the nest and crawl to the water, missed nests and hatching events during routine nesting surveys, and temporary or long-term alterations to SRI's beach and dune topography. Protective management actions have been incorporated into the Proposed Action to avoid or minimize the potential impacts (Section 2.1).

The effects on sea turtle reproduction and appropriate management actions for ALRT testing on SRI have been separated into four categories: deterrence, obstruction, disorientation, and survey interference. These categories, as described below, are the basis for the impact analysis for ALRT testing activities.

- **Deterrence:** Nesting females may be deterred from entering the beach during nighttime testing because of high-powered flashlights and the presence of personnel. Actively nesting females may be deterred from completing the egg-laying process for this same reason. Bright lighting around nesting beaches also adversely affects the nesting process of adult turtles, as the turtles would avoid areas subject to bright light. Helicopter noise during night testing might also deter nesting turtles.
- **Obstruction:** Mines, barricades, and obstacles staged on the beachfront may impede the nesting activities of females coming ashore, may entrap a sea turtle, and may obstruct the movement of hatchlings to the water.
- **Disorientation/Misorientation:** The principal component of the sea-finding behavior of emergent hatchlings is their visual response to light. For this reason, bright lights used by ground and surface personnel may result in the disorientation (loss of bearing) or misorientation (incorrect bearing) of the hatchlings. As a result, the exposure of the hatchlings to predation and desiccation is substantially increased.
- **Survey Interference:** Survey interference involves ground and surface personnel disturbing evidence of sea turtle crawls/nests. This would adversely affect the ability to identify, index, and monitor nests, as well as impede the ability to carry out avoidance and minimization procedures, such as nest relocation actions, that would help to minimize potential impacts from ALRT activities.

### **Setup and Removal of Targets**

Set up and removal of targets would only occur during the day. Equipment vehicles may enter the dune and beach area from the road to disperse the mines, obstacles, and barricades for the ALRT tests. Equipment would be used only during daylight hours and would, therefore, not be expected to pose a direct threat to adult sea turtles or hatchlings. Set up would take approximately three to four days; removal would take approximately two to three days.

There is a possible risk of indirect impact to nesting females, hatchlings, and nests during sea turtle season on the beachfront. Heavy vehicle movement and set up of targets may disturb evidence of sea turtle crawls and nests. To prevent this, the test area would be surveyed for evidence of sea turtle activity prior to set up and removal of targets. Setup would not begin until the sea turtle survey is completed. Equipment used for the setup and removal of targets would not be left on the beach overnight.

There is small risk of direct physical impact to nests in the test area. Personnel would be instructed to remain within the designated test area and avoid dunes over 1.5 m (5 ft) high, thereby reducing impacts to nesting habitat. If a nest were found prior to set up, the test could potentially be relocated east or west of the test boundaries by a distance of at least 15.24 m (50 ft). All nests would be well marked and avoided. Turtle nests are marked in accordance with the State of Florida Nesting Beach Protocol and Eglin's Turtle Surveying Permit. Nests are marked with four stakes wrapped with surveyors tape, and a "Sea Turtle Nest" sign identifying it as a nest. If nests are relocated then there is a potential impact to the nest. Vehicle ruts may impede the movement of hatchlings; however, ruts would be filled in before dark during nesting season.

Management actions to reduce impacts to sea turtles are required as part of the Proposed Action (Section 2.1) and the previous formal ALRT Section 7 consultation which provides "take" for 61,512 m<sup>2</sup> (15.2 acres) of nesting habitat for sea turtles. With these management actions and by following the terms and conditions of the previous ALRT Section 7 consultation, Eglin NRS has determined that the setup and removal activities associated with ALRT testing are **likely to adversely affect** sea turtles reproduction on SRI. An amendment letter to the previous formal ALRT Section 7 consultation will be sent to the USFWS to indicate the potential changes (but no increase in "take") in the ALRT missions.

### **Mines, Obstacles, and Barricades**

Obstacles would include floats and buoys, scientific instrumentation, tetrahedrons, structural hedgehogs, and concrete cubes (4 ft × 4 ft × 4 ft [1.2 m × 1.2 m × 1.2 m]) (Figure 2-6). Barricades would include concertina wire or wire rolls, to simulate concertina wire (Figure 2-7), tanglefoot barbed wire fencing, and structural sea urchins on the beach only (Figure 2-8). Figure 2-9 illustrates the proposed target area layout. Mines, obstacles, and barricades may discourage female sea turtles from nesting on the beachfront during nesting season. The size of an inert mine is approximately 929 square centimeters (cm<sup>2</sup>) (1 ft<sup>2</sup>) and a structural hedgehog is approximately 1 cubic meter (35 cubic feet) and would be placed directly on the ground. The common and simulated concertina wire is approximately 1.22 m (4 ft) wide and would stretch 73.15 m to 91.44 m (80 to 100 yards), giving an estimated total footprint for the wire of 110 m<sup>2</sup> (91 m wide by 1.2 m deep) or 1,200 ft<sup>2</sup> (300 ft wide by 4 ft deep). Calculations of peak nesting rates show that the estimated number of nests deterred in a half-mile area around the test area over the entire nesting season would be 0.71 loggerhead turtle nests and 0.07 green turtle nests (Eglin GIS, 2007). In reality, the area of deterrence created by ALRT mines, obstacles, and barricades would be much less than a half-mile, reducing the probability of deterrence even further.

During hatching season, all sea turtle nests would be marked and protected in accordance with established Eglin NRS protocol. In the rare event that a sea turtle nest was identified inside the proposed test area and the test area could not be moved to avoid the nesting area, the nest would be relocated to a distance of at least 15 m (50 ft) from the test area boundary. This would alleviate possible impacts to hatchlings attempting to enter the water. Eglin NRS biologists would install a series of stakes and highly visible survey ribbon to establish a radius surrounding the nest. No activity would occur within this area.

Eglin NRS has determined that the mines, obstacles, and barricades associated with ALRT testing are likely to adversely affect sea turtles during the nesting season. An amendment letter to the previous formal ALRT Section 7 consultation will be sent to the USFWS to indicate the potential changes (but no increase in “take”) in the ALRT missions. The management actions described in the Proposed Action (Section 2.1) would be implemented to minimize impacts to sea turtles.

### **Safety Surveys**

Due to the laser safety issues, ground and surface personnel would be placed on the outer edges of the test area to inform personnel not to use binoculars during ALRT testing and to survey the area for unauthorized people on SRI. Ground and surface personnel would be on the beach (Gulf and sound sides) and road with high-powered flashlights during data collection flights.

The principal component of the sea-finding behavior of emergent hatchlings is their visual response to light. For this reason, bright lighting along beachfronts often results in the disorientation (loss of bearing) or misorientation (incorrect bearing) of the hatchlings. As a result, the exposure of the hatchlings to predation and desiccation is substantially increased.

Lights from ground and surface personnel operating within one-half mile of a hatching nest may pose a disorientation threat. To prevent this, the test area would be surveyed by the ground and surface personnel for evidence of sea turtle activity prior to night activities. Bright lighting around nesting beaches also adversely affects the nesting process of adult sea turtles, as they would avoid areas subject to bright light. To reduce risk of direct physical impact to nests, adults, and hatchlings, spotters would be equipped with lights to aid in avoiding any nests or hatchlings. All lighting on the beach would be reduced to the lowest extent possible; however, due to safety concerns, some lights would be required. Ground and surface personnel would be used only during ALRT data collection flights.

Eglin NRS has determined that safety surveys associated with ALRT testing are likely to adversely affect sea turtles during the nesting season. The management actions described in the Proposed Action (Section 2.1) would be implemented to minimize impacts to sea turtles.

### *Sea Turtles in the Water*

Of the five species of marine turtle found in the Gulf of Mexico, three are known to nest along Eglin beaches: the Atlantic loggerhead, leatherback, and the Atlantic green. Sea turtle nesting in the northwest region of Florida generally initiates in mid-May, with turtles beginning to congregate offshore in the March/April time frame. Peak nesting activity occurs in June and

July, and nesting generally concludes by the end of August. Seasonal timing of the project could potentially affect sea turtles and hatchlings.

Stranding reports for all five sea turtle species have been documented from the northern Gulf region based on index beach nesting zones. According to the nesting and stranding information, there is a potential for any of the five sea turtle species to occur on SRI, but loggerheads and green turtles are the only ones that have been documented in the proposed area of interest. This area of interest, Test Area A-15, falls within three index beach nesting zones over a distance of 2,414 m or 1.5 mi. During testing, only 100 m (328 ft) of the 2.4 km (1.5 mi) width would be utilized for barricade and obstacle array; however other parts of this test field may be utilized for planting smaller, scattered, inert mine fields. ALRT testing will have equipment set out no more than 30 m (98 ft) offshore or 4 m (13 ft) of depth. Eglin NRS, with coordination with NMFS, believes that using the historic nesting/false crawl data from Test Area A-15 is the best indicator of turtle species and numbers present in the nearshore waters (NMFS, 2007b). Nesting data refers to confirmed nests laid each year and false crawl data refers to turtles coming ashore but not laying nests. The majority of turtles this close to the shoreline would be female turtles coming to shore or hatchlings finding their way into the water. There would be a small possibility of foraging turtles in this area as well.

A density estimate for turtles in the water was calculated by using the length of shoreline for the area of interest (2,414 m or 1.5 mi), the historical number of nests and false crawls within that area, and the number of years surveyed. Although the beach has been surveyed for 18 years, green turtles typically nest every other year in contrast to loggerheads, which nest every year. In order to be conservative, the historic number of nests/false crawls for green turtles were divided by the number of years green turtle nests were present (11 out of 18 years). Loggerhead nests/false crawls were divided by the entire 18 years. This division yields an average number of turtles per year within the 2.4-km (1.5-mi) area. However, the ALRT set-up area would only take place over a distance of 100 m (328 ft). By dividing the average number of turtles per year by the total distance (in meters) of the proposed area of interest and multiplying that number by 100 m, the density of turtles per 100 m per year within the proposed area of interest was calculated as shown in Table 4-2.

**Table 4-2. Density of Sea Turtles Within Proposed Area of Interest**

Species	Total Distance (m) of Proposed Area of Interest (A-15)	Historic # of Nests/False Crawls Within that Area	# of Years Surveyed	Average # of Turtles Per Year	# of Turtles per 100 m Per Year
Loggerhead	2,414	44	18	2.44	0.10
Green	2,414	9	11	0.82	0.03

m = meters

The primary issue of concern regarding ALRT testing is the potential for sea turtle entanglement or entrapment caused by the obstacles or barricades located in the water. Although the chance is remote, if sea turtles did enter the proposed area of interest, potential effects could include the risk of entanglement in buoy or float lines or entanglement in the obstacles or barricades placed in the water. Float lines from boundary markers and targets (PDM-2 mines) may entangle larger sea turtles. Additionally, the proposed lighting of the buoy markers may attract sea turtles to the floats, resulting in an increased risk of entanglement in the float line.

The chance of a turtle being in the proposed area of interest during ALRT testing would be extremely small for both loggerhead and green sea turtles, especially considering the obstacles or barricades would be in the water for only one to two weeks at a time. Based on historical numbers of nests and false crawls in the project area (Table 4-2), calculations showed that only 0.10 loggerheads and 0.03 green sea turtles per 100 m (328 ft) would be expected in the project area annually.

The concertina wire, structural sea urchins, and other similar obstacles or barricades placed in the Gulf of Mexico would pose an entrapment risk to sea turtles. Due to the size of the obstacles or barricades the risk of entrapment would be greatest for female nesting sea turtles and foraging sea turtles. Although the placement of items poses a potential risk to sea turtles at any water depth, those placed at the 1.3-m (4.27-ft) depth pose a greater risk of entrapment since there would be little or no clearance over the structures in the water column. Additionally, many of the turtles found in this water depth would be females coming ashore to nest. Turtles encountering these structures may become entrapped in the shallow-water structures or may be deterred from coming ashore to nest.

Eglin NRS determined that even though the density numbers are small, if a sea turtle were in the proposed area of interest, it would likely be adversely affected by objects such as the structural hedgehogs, PDM-2 mines, and float lines that pose a risk of entrapment or entanglement. However, as detailed in Section 2.1, the floats, float lines, and submerged obstacles or barricades would be checked daily for trapped marine animals. The other obstacles or barricades in the project area are larger and do not have areas where a turtle could become entrapped; turtles are expected to react to these in the same manner as they would to artificial reefs. Therefore, the other obstacles or barricades in the water other than structural hedgehogs, PDM-2 mines, and float lines are not likely to adversely impact adult sea turtles.

Hatchlings may encounter structural hedgehogs while entering the water and beginning their offshore migration; however, due to their size, construction, and spacing between structural hedgehogs, the risk of entrapment and interruption of offshore swimming is not considered a major threat to hatchlings.

Section 7 consultation with the NMFS would be required.

#### *Piping Plover*

Piping plovers can be expected to leave northern breeding grounds and arrive in wintering habitat as early as mid-July and return north again to breed in March (USFWS, 2001). Eglin NRS conducts shorebird surveys on SRI during the wintering season. Although only a small section of SRI has been designated as critical habitat (see *Critical Habitat* discussion above), piping plovers may be found any place that affords proper foraging and sheltering resources. Piping plovers are known to forage in exposed wet sand areas such as wash zones, intertidal ocean beachfronts, wrack lines, washover passes, mud and sand flats, ephemeral ponds, and salt marshes.

In the unlikely event that a piping plover was found in or near the test area, noise associated with the placement of mines, obstacles, and barricades could be expected to flush the bird from the

area, possibly causing stress and extra caloric expenditure. Setup and removal of targets of the test area would take less than one week. During this time, displaced plovers may simply move on to undisturbed foraging areas nearby.

All flights over SRI would be no lower than an altitude of 152 m (500 ft), thus no impact to piping plovers is expected from aviation operations over SRI. The laser associated with the ALRT testing would have no effect on the piping plover as discussed in the Proposed Action section of this document.

Noise impacts would be temporary and localized; therefore, ALRT testing on SRI is **not likely to adversely affect** the wintering piping plover population.

#### *Gulf Sturgeon*

Little is known about sturgeon use of the Gulf of Mexico. Most subadult and adult Gulf sturgeon spend cool months (October or November through March or April) in estuarine areas, bays, or in the Gulf of Mexico (Odenkirk, 1989; Foster, 1993; Clugston et al., 1995; and Fox et al., 2002). In the spring (March to May), most adult and subadult Gulf sturgeon return to their natal rivers, where they remain until October or November (Odenkirk, 1989; Foster, 1993; Clugston et al., 1995; and Fox et al., 2000).

If the Proposed Action took place between March and October, Gulf sturgeon would not likely be present in the Gulf of Mexico at this time. Therefore, between March and October, Eglin believes the Proposed Action would have **no effect** on the Gulf sturgeon.

If the Proposed Action took place between November and March, a potential for injury or mortality to the Gulf sturgeon would exist. Due to a lack of data on Gulf sturgeon in the Gulf of Mexico, species numbers cannot be estimated; however, no Gulf sturgeon have been documented in the project area, and radio monitoring in the Gulf of Mexico approximately 1.61 km (1 mi) offshore SRI on 18 January 1998 recorded no radio-tagged fish. ALRT missions would include inert mines and obstacles (floats and buoys, scientific instrumentation, tetrahedrons, structural hedgehogs, and concrete cubes 4 ft × 4 ft × 4 ft [1.2 m × 1.2 m × 1.2 m]) in the water. However, none of these would be placed further than 30 m (98.4 ft) offshore the island or more than 4-m depth. The mines, obstacles and barricades used in ALRT testing would be placed in waters no more than 4 m (13 ft) deep. Data collected by USFWS during the winter of 1999 showed that sturgeon appear to use waters that are deeper than those found within the proposed project area, though data are insufficient to rule out the possibility that sturgeon could use the nearshore waters.

There is a small, but unlikely, chance that Gulf sturgeon would be directly impacted by the mines or obstacles in the water through entrapment however the potential for direct impacts are considered remote. The insertion of these devices around the edge of the target field (either anchored to screw anchors or to poles jetted into the sand) is the only aspect of the activity that could result in physical contact with this species. The probability that a sturgeon would be present at the time and location of the placement of the devices is low. The potential also exists

for entanglement in concertina wire rolls and structural sea urchins in the water. However, the concertina wire and structural sea urchins are so close to the shore and in shallow water that there is little chance of sturgeon being present. In addition, the disturbance and noise associated with putting equipment in place would likely cause any sturgeon to leave the area before the commencement of activities. As a precaution, visual clearance procedures would be conducted prior to placement of the mines and obstacles, as detailed in Section 2.1. Therefore, Eglin NRS believes the Proposed Action is **not likely to adversely affect** the Gulf sturgeon.

#### *Santa Rosa Beach Mouse*

It is unlikely that the ALRT activities on SRI would impact the Santa Rosa beach mouse. Potential for direct impacts to the Santa Rosa beach mouse from ALRT activities is low; beach mice tend to spend most of their time in burrows in dunes during daylight. Foraging behavior at night may be temporarily disrupted during night testing activities, however it is likely that foraging would resume after activities associated with the data collection flight concluded. Lighting during night activities from ground and surface personnel would make the mice more visible, which could increase their vulnerability to predators; however ALRT activities would likely cause other species such as predators (e.g. feral cats, coyotes) to avoid the area. Additionally, dunes and dune systems would be avoided by associated equipment. This measure would greatly minimize impacts to dunes and dune vegetation, as well as reduce potential impacts to beach mice and their burrows.

#### *Shorebirds and Wading Birds*

Some shorebirds may be temporarily displaced as a result of noise from equipment and personnel during activities. Colonies or individual nests of several state-listed shorebird species (least terns, southeastern snowy plovers, and black skimmers) are usually found along the rack line or other suitable habitat along the beach and have the potential to occur within the Proposed Action area. Land-based activities near shorebird nesting areas may result in a flush/startle response. During nesting season, this may result in a potentially increased vulnerability of eggs and chicks to predation. However, foraging species would typically move on to other areas, while nesting species would return after the general disturbance was over. These activities would also likely scare other species such as predators (e.g. feral cats, coyotes) from the area, thus reducing the chances of nest predation should nesting birds be flushed.

State-listed wading birds, such as the snowy egret, little blue heron, tri-colored heron, and white ibis, forage mainly in wetland areas or along shorelines of saltwater and freshwater water bodies. A breeding area for several wading bird species is documented to occur along the west shore of East Pass on SRI. Eglin NRS would conduct a shorebird nesting survey prior to ALRT testing setup. If colonies of nesting birds are located at the test area, the ALRT test location would be repositioned away from the nesting site. Eglin NRS has determined that the Proposed Action would have minimal impact on shorebirds and their nesting areas with this avoidance and minimization measure in place.

*Florida Perforate Lichen*

As the Proposed Action would not take place near Florida perforate lichen areas on SRI, Eglin NRS has made a **no effect** determination for potential impacts to the Florida perforate lichen from ALRT activities.

*Marine Mammals*

Other species considered include marine mammals such as the bottlenose dolphin. After discussion with the NMFS, entrapment seems highly unlikely in the surf zone for marine mammals, especially since the obstacles or barricades would only be in the water for one to two weeks at a time and the mission area is not considered good marine mammal habitat (NMFS, 2007c). In addition, direct impacts to marine mammals would be minimized by visual clearance procedures, as detailed in Section 2.1. Impacts to marine mammals from the Proposed Action are not anticipated; however, Eglin Natural Resources would obtain a Letter of Concurrence from NMFS Office of Protected Resources.

**Management Recommendations**

In addition to the management actions that are part of the Proposed Action (Section 2.1), another management recommendation could further reduce potential impacts to biological resources:

- To minimize the potential for impacts to vegetation and the introduction of invasive nonnative species, ALRT vehicles/equipment would use established paths and roads.

*Noise from Maintenance, Setup, Takedown Activities*

Barges and other vessels would be used during setup, takedown, and maintenance activities. Cavitation from propeller blades may potentially be a source of underwater noise. Because the Gulf of Mexico and Santa Rosa Sound are frequently used by recreational and commercial vessels, the utilization of barges to place the inert mines and other targets in the water would not generate significant noise to make an impact compared to the existing background noise from other boat traffic. Furthermore, the duration of these setup and takedown events would be minimal. Thus, no species would be impacted by boat noise.

**Hearing Frequency Range***Sea Turtles*

Best estimates for sea turtle hearing bands are taken from studies by Ridgway et al. (1969) and Mrosovksy (1972). In these cases, the judgment is that turtles have poor hearing above about 1 kHz and have a higher acoustic threshold than marine mammals, above 200 dB. As stated in Section 4.3.1, acoustic levels even immediately below an aircraft hovering at the lowest altitudes would not exceed 130 dB.

### Piping Plover

Lower-level flights (nearing the 150-m [500-ft] basement level) over or landings near piping plover critical habitat or shorebird nesting areas may result in a flush/startle response. During shorebird nesting season, this may result in a potential increased vulnerability of eggs and chicks to predation. However, due to the short duration of such overflight events, it is likely that the shorebird would return to the area soon after the incident. Even so, it would be preferable to avoid plover critical habitat during wintering season (15 July to 15 May) and known shorebird nesting and feeding areas during nesting season (1 March to 31 August).

### Gulf Sturgeon

Although sound travels rapidly through water, noise generated in air is not easily transmitted underwater. As sound crosses the air-water interface, decibel levels decrease further. No impacts from helicopter noise will be expected to underwater animals or amphibians/marine mammals while submerged. Thus, pelagic fish species such as the Gulf sturgeon would not be adversely affected by helicopter noise.

### Santa Rosa Beach Mouse

No information on potential noise effects to small mammals is readily available. However, if hearing damage levels for the Santa Rosa beach mouse are assumed to be similar to those for humans, then for missions with noise levels exceeding 140 dB<sub>LP</sub>, beach mouse habitat would need to be avoided. Coordination with NRS staff would be necessary to determine current locations of the beach mouse. Reproduction peaks in winter months, so there should be a minimization of missions near known beach mouse locations during this period. Also, because beach mice are mostly nocturnal, a minimization of nighttime missions would be preferable.

### Shorebirds and Wading Birds

Flight responses have been noted in sea birds exposed to aircraft noise greater than 85 dBA. Startle effects increase when the noise occurs simultaneously with a visual presence, such as a low flying aircraft. Therefore, those species within sight of an aircraft have the greatest chance of being startled. Shorebird species that are in the early stages of nest building and egg laying, and chicks in the early fledgling stages could potentially be affected to the greatest degree since untended eggs and young could be exposed to increased predation and weather, but given the short duration of the mission noise sources, most birds would likely return to their nests quickly. It would be preferable to avoid known shorebird nesting and feeding areas during nesting season (1 March to 31 August) to minimize negative impacts to eggs and chicks.

### Marine Mammals

Cetaceans, such as dolphins, are common to the eastern Gulf of Mexico and Atlantic Ocean and are protected under the MMPA. Species likely to be encountered within the study areas are the bottlenose dolphin, *Tursiops truncatus*, and the Atlantic spotted dolphin, *Stenella frontalis*. Based on recent surveys, the density of bottlenose and Atlantic spotted dolphin groups occurring

at the surface within an area of the eastern Gulf, 3 by 3 NM (9 square nautical miles), would be less than one. This takes into account that bottlenose dolphin have an average group size of 7.3. Large groups of cetaceans are more visible when at the surface and would be easily tracked during aerial and shipboard surveys and avoided. Many other species of cetaceans, including whales, occur in the Gulf of Mexico but prefer deeper waters and are found farther offshore; thus, they would not be affected by the Proposed Action.

Because impact criteria for marine mammals are based on auditory damage, the hearing bands for marine mammals are important factors in the risk analysis. Hearing ranges of marine mammals has been an important research topic for at least 50 years. Direct measurements of hearing sensitivities for nine species of small odontocetes and several species of pinnipeds have been made in quiet tanks under controlled conditions. On the other hand, hearing ranges for mysticetes, sperm whales, and mid-sized odontocetes can only be inferred from observations of reactions to given sounds and from sound production (assuming that the animal may hear most of the sound).

Standard literature on the topic (Richardson et al., 1995; Ketten, 1995; Ketten, 1998) implies that 200 kHz is the upper range of hearing for all marine mammals. This research indicates the animal cannot hear a sound above 200 kHz, and that no discernable hearing damage would result. Actual physical harm (lung injury, permanent threshold shift, eardrum rupture) generally requires a minimum intensity level at the animals of 200 dB.

One effect level when considering potential noise impacts to cetaceans from overpressure is 12 pounds per square inch (psi), a level at which temporary threshold shift may occur. Since the in-air level of 0.0003 psi generated by the rotor blades does not approach the 12-psi level and would be even further diminished after transmission through water, no significant overpressures, and thus no significant noise impacts, should result. Hence, no effects are expected from the potential effects of aircraft noise on marine mammals.

#### 4.4.2 Alternative 1

##### Aircraft Use

Since Alternative 1 would implement the testing program of Proposed Action with the exceptions of simulated concertina wire and structural sea urchins in the water under this alternative, potential impacts from aircraft use would be the same as those for the Proposed Action.

##### Laser Use

Since Alternative 1 would implement the testing program of Proposed Action with the exceptions of simulated concertina wire and structural sea urchins in the water under this alternative, potential impacts from laser use would be the same as those for the Proposed Action.

## Target Fields and Safety Surveys

### *Flora and Fauna*

Potential impacts to flora and fauna would be the same as those for the Proposed Action, with the elimination of the potential for entanglement in concertina wire or simulated wire rolls and structural sea urchins in the water. Impacts to flora and fauna (other than sensitive species covered below) are not anticipated.

### *Sensitive Habitats*

Potential impacts from target fields and safety surveys would be the same as those for the Proposed Action.

### *Sensitive Species*

#### *Sea Turtles*

For sea turtles on the beach, potential impacts from target fields would be the same as those for the Proposed Action.

Potential impacts to sea turtles in the water would be similar to those for the Proposed Action, with the exception that under Alternative 1 concertina wire or simulated wire rolls would not be present in the water. The primary issue of concern is the potential for sea turtle entanglement or entrapment caused by obstacles in the water. Although the chance is remote, if sea turtles did enter the proposed area of interest, potential effects could include the risk of entanglement. Additionally, many of the turtles found in these shallow waters would be females coming ashore to nest. Turtles encountering these structures may become entrapped in the shallow-water structures or may be deterred from coming ashore to nest. The chance of a turtle being in the project area during ALRT testing would be extremely small for both loggerhead and green sea turtles, especially considering the obstacles would be in the water for only one to two weeks at a time. Based on historical numbers of nests and false crawls in the project area (Table 4-2), calculations showed that only 0.10 loggerheads and 0.03 green sea turtles per 100 m (328 ft) would be expected in the project area annually.

Eglin NRS determined that even though the density numbers are small, if a sea turtle were in the proposed area of interest it would likely be adversely affected by the obstacles that pose a risk of entrapment or entanglement. However, as detailed in Section 2.1, the project area would be checked daily for trapped marine animals.

Hatchlings may encounter obstacles while entering the water and beginning their offshore migration. Because these structures are long and basically continuous, the risk of entrapment and interruption of offshore swimming is present for hatchlings. However, nesting and hatching surveys and nest relocation would be conducted in the project area (see Section 2.1), thus hatchlings should not be present in the project area and would not be impacted by the obstacles.

*Piping Plover*

Potential impacts from target fields and safety surveys would be the same as those for the Proposed Action.

*Gulf Sturgeon*

Potential impacts to the Gulf sturgeon would be the same as those for the Proposed Action, with the subtraction of the potential for entanglement in concertina wire rolls and structural sea urchins in the water. Additionally, the project area would be surveyed daily for the presence of sensitive animals, such as the Gulf sturgeon (see Section 2.1). Therefore, Eglin NRS believes the Proposed Action is **not likely to adversely affect** the Gulf sturgeon.

*Santa Rosa Beach Mouse*

Potential impacts from target fields and safety surveys would be the same as those for the Proposed Action.

*Shorebirds and Wading Birds*

Potential impacts from target fields and safety surveys would be the same as those for the Proposed Action.

*Marine Mammals*

Potential impacts to marine mammals would be the same as those for Alternative 1, with the exception of concertina wire rolls and structural sea urchins in the water not being an aspect of this Alternative. Additionally, the project area would be surveyed daily for the presence of sensitive animals, such as marine mammals (see Section 2.1). As a result, impacts to marine mammals from Alternative 1 are not anticipated.

*Invasive Nonnative Species*

Potential impacts from target fields and safety surveys would be the same as those for the Proposed Action.

**4.4.3 No Action Alternative**

Potential impacts from aircraft use, laser use, target fields, and safety surveys would be similar to or less than those for the Proposed Action or Alternative 1. Under this alternative, no additional testing beyond the current mission would take place, so noise would remain at baseline levels and no additional laser radiation would occur.

## 4.5 SOCIOECONOMIC RESOURCES

### 4.5.1 Proposed Action (Preferred Alternative)

The Proposed Action is not anticipated to cause any major negative impacts to socioeconomic resources. Recreational or commercial fisheries or commercial shipping would not be significantly impacted. ALRT activities would require the closure of offshore waters during testing, which might interfere with access to certain fishing areas; however, closures would only last for one to two weeks and other fishing waters are available nearby. Regional tourism would not be impacted, as onshore project areas sites are within Air Force test facilities where public access is prohibited.

### 4.5.2 Alternative 1

Impacts under Alternative 1 would be identical to those presented under the Proposed Action (Preferred Alternative).

### 4.5.3 No Action Alternative

There would be no change to commercial or recreational fishing or commercial shipping under the No Action Alternative. The ALRT testing program would continue with the current target layout that no longer meets the needs of the program.

## 4.6 SAFETY

### 4.6.1 Proposed Action (Preferred Alternative)

The ALRT includes ALDAI-W and ROAR systems to detect, localize, and classify moored inert mines and other targets placed in water or on the beach. The targets in each test would be located using the ALDAI-W or ROAR laser system. The specifications of each system can be viewed in Tables 2-1 to 2-4.

The basis of the hazard classification scheme in Section 3.0 of ANSI Z136.1-2000 is the ability of the primary laser beam or reflected laser beam to cause biological damage to the eye or skin during use. The ALDAI-W and ROAR lasers are both Class 4 laser systems (high-power), which presents a serious potential hazard to the eye and/or skin from direct or specular reflections and/or from diffuse reflection. It is important to note that the laser classification given in the standard relates specifically to the laser product and its potential hazard based on operating characteristics. However, the conditions under which the laser is used, the level of safety training of individuals using the laser, and other environmental and personnel factors are important considerations in determining the required safety control measures.

#### Criteria and Thresholds for Laser Injury

The American National Standard for Safe Use of Lasers, ANSI Z136.1-2000, defines maximum permissible exposure (MPE) as a level of laser radiation, in units of joules per square centimeter ( $J/cm^2$ ), to which a person may be exposed without hazardous effect or adverse biological

changes in the eye or skin. The MPE values are threshold exposure levels below known hazardous levels, although exposure to levels at the MPE values may be uncomfortable to view or feel upon the skin. MPE levels are calculated relative to the number of pulses per exposure, so MPE levels for the ALMDS laser are calculated for several exposure durations. For the wavelength and pulse duration of ALMDS, the MPE is as follows, with a correction factor ( $C_E$ ) introduced for diffuse reflections.

$$\text{MPE (single-pulse)} = 5.0 C_E \times 10^{-7} \text{ J/cm}^2$$

The MPE for skin contact ( $\text{MPE}_{\text{skin}}$ ) values are well above the MPE for eye contact ( $\text{MPE}_{\text{eye}}$ ) values. At an operational distance from the water surface of 152.5 m to 305 m (500 to 1,000 ft), the laser poses no skin hazard to humans at the surface. Because the light from the laser entering the eye at certain wavelengths can be focused to an extremely small image on the retina, the focusing power of the eye, and  $\text{MPE}_{\text{skin}}$  values well above the  $\text{MPE}_{\text{eye}}$  values, this discussion conservatively concentrates on injuries to the eye. It is important to note that the  $\text{MPE}_{\text{eye}}$  value at the surface of the water is based on ANSI Z136.1-2000 MPE values for the unaided observer. Any persons who observe the ALDAI-W or ROAR laser while using binoculars or other optical devices may be exposed to unsafe levels above the acceptable MPE values.

The ALDAI-W is eye-safe at distances beyond 47.8 m (157 ft) to the unaided eye and requires one to come within 7.62 cm (3 inches) in order to cause skin damage. The ROAR laser has the potential to be significantly more hazardous and operates in a variety of settings. Even in the most dangerous case, one would have to come within 5 m (16.5 ft) of the exit port in order to receive skin damage from the radiation. However, all configurations but one (690 mm/45 mradians on land) represent eye hazards within the operating altitude of 150 to 644 m (500 to 2113 ft) (beyond that, all are safe).

## Mitigation Measures

Measures would be implemented to decrease the risk of a laser-related injury to personnel even in configurations and at altitudes that are generally not eye-safe. First, the area would be cleared of all but authorized personnel participating in the testing. Ground and marine spotters would clear the area of any unauthorized persons before beginning ALRT test procedures. Spotters would maintain the integrity of the test area throughout the duration of all testing events. NOTAMs and NOTMARs would be issued to inform airmen and mariners that testing will be taking place and that access to the area will be restricted.

Furthermore, the laser systems have integrated measures to decrease the likelihood of eye or skin injury. Lasers are contained in a metal enclosure equipped with a motorized shutter to prevent accidental release of radiation. All ground personnel would be required to wear laser protective eyewear at all times. Additionally, the pilot and backseat engineer would both have access to a master shutdown switch, which can terminate laser firing at anytime if an emergency occurs. The engineer and pilot would maintain communication with ground crews at all times, and all test personnel would have the ability to call for laser shutdown at any time. The aircrew engineer would only operate the laser while crossing areas within the target field, including a 50-ft buffer zone before and after the targets, and the system would be shut down after each pass.

With these measures in place, there are no impacts anticipated as a result of exposure to laser radiation.

#### **4.6.2 Alternative 1**

Alternative 1 would utilize the same laser systems and the same safety measures would be employed, so the effects would be the same as the Proposed Action.

#### **4.6.3 No Action Alternative**

There would be no change to safety issues under the No Action Alternative. The ALRT testing program would continue with the current target layout that no longer meets the needs of the program.

### **4.7 CULTURAL RESOURCES**

The placement of obstacles, as well as the use of vehicles on loose sandy soils for mine and obstacle placement, could potentially affect cultural resources if present within the project area. The Air Force surveys areas potentially affected by mission activities as part of the Air Force Environmental Impact Analysis Process (AFI 32-7061, 32 CFR 989), and mitigative or management measures are developed to minimize any potential impacts. Defining these areas potentially affects project planners and managers in decision-making for relocation of a project site to avoid delays necessitated by additional investigation and/or consultation.

#### **4.7.1 Proposed Action (Preferred Alternative)**

Under the Proposed Action, known historic structures at Test Area A-15 are not expected to be impacted by the Proposed Action. The Proposed Action likewise would not impact known terrestrial archaeological sites or submerged resources.

Should any inadvertent discoveries of historic properties be made during the course of obstacle placement or testing, all actions in the immediate vicinity would cease and efforts would be taken to protect the find from further impact. The Eglin Cultural Resources Branch should be contacted immediately should an unintended discovery occur.

#### **4.7.2 Alternative 1**

Impacts under Alternative 1 would be identical to those presented under the Proposed Action (Preferred Alternative).

#### **4.7.3 No Action Alternative**

There would be no impact to cultural resources under the No Action Alternative. The ALRT testing program would continue with the current target layout that no longer meets the needs of the program.

## 4.8 CUMULATIVE IMPACT ANALYSIS PROCESS

According to the CEQ regulations, cumulative impact analysis in an EA should consider the potential environmental impacts resulting from “the incremental impacts the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions” (40 CFR 1508.7).

40 CFR 1508.7 defines impacts or effects as:

- “(a) Direct effects, which are caused by the action and occur at the same time and place.
- (b) Indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.”

### 4.8.1 Past and Present Actions Relevant to the Proposed Action

In 2003, the U.S. Marines and U.S. Navy conducted amphibious readiness group training on Eglin AFB. Certain areas on the SRI Range Complex were used for amphibious vehicle access and transition points. Some facilities were used as objectives. An amphibious vehicle cross-over location was established west of Test Area A-13B.

In a separate but related action, the Air Force is repairing the damage to roads and culverts on the SRI Range Complex. Storm surge from hurricanes have caused numerous washouts and in some places completely eradicated a road that runs the length of the SRI Range Complex. Road and culvert repair consists of reconstructing 5 km (3.1 mi) of full roadway width (6.7 m or 22 ft) and 5.63 km (3.5 mi) of half-roadway (3.35 m or 11 ft). The Air Force will remove the damaged sections of road and will place the new road as close to the old alignment as possible. Twelve pre-cast box culverts, totaling over 200 linear feet, will be added in areas that have seen recurring drainage and erosion problems. At each box culvert, sheet piling will be added for further erosion protection. The roadway pavement design includes reinforced concrete for 122 m (400 ft) at each of these box culverts to add further protection against future erosion. The pavement adjacent to the box culverts also has reinforced concrete beams at the edge of the roadway to prevent erosion under the road. The typical pavement section in the areas other than the box culverts is 15.24 cm (6 inches) of asphalt over 30.5 cm (12 inches) of compacted base. The road shoulders have been protected to prevent scouring under the roadway. The Air Force will obtain a dredge and fill permit from the FDEP and the USACE for the box culverts.

Shoreline restoration is occurring in adjacent or nearby counties. The USACE is restoring 27.36 km (17 mi) of beach in Bay County and lesser amounts in Destin (Okaloosa County) and Walton and Escambia Counties. Sand is being obtained from offshore locations with a hopper dredge and pumped onto the beach, or in the case of the Destin and Walton County restoration, from a sand shoal off of East Pass. Bulldozers then move the sand to the appropriate location.

The USACE is dredging East Pass, the channel that borders SRI Air Force property on the easternmost end. Hurricanes and tropical storms have moved substantial amounts of sediment into the channel, creating shallow areas that pose navigation hazards to vessels.

#### **4.8.2 Reasonably Foreseeable Future Actions**

The U.S. Air Force 46<sup>th</sup> TW seeks a long-term solution to preserve mission capabilities on SRI by protecting facilities at risk of damage from storm surge and wave action. Some facilities have undermined foundations and are unsafe for occupation. Others are at risk of collapsing into the Gulf of Mexico if action is not taken. The 46<sup>th</sup> TW proposes to preserve mission capabilities on SRI by restoring eroded shoreline and dune land mass.

Seventeen miles of shoreline require restoration. The 46<sup>th</sup> TW has placed priority around 8 km (5 mi) of shoreline at a few “priority” test sites. The 46<sup>th</sup> TW would restore dunes at 23 general locations along Air Force-owned SRI. The USACE would oversee contractors to dredge sand from an offshore location and pump it onto the SRI Range Complex beach area. USACE contractors would then bulldoze the sand in place for either shoreline restoration or dune reconstruction. The ALRT program will not affect any beach restoration projects on SRI.

Under the initial Base Realignment and Closure announcement of May 2005, Eglin AFB would lose 28 military and 42 civilians and gain 2,168 military and 120 civilians for a total gain of 2,140 military and 78 civilians. One action that may be relevant to the Proposed Action is the beddown of the Joint Strike Fighter and the relocation of the 7<sup>th</sup> Special Forces Group from Fort Bragg, North Carolina, to Eglin AFB.

The 7<sup>th</sup> Special Forces Group would be relocated from Fort Bragg to Eglin AFB to enhance military value and training capabilities by locating special operations forces in locations that best support joint specialized training needs. Many special operations groups use SRI for training. As a special operations force, the 7<sup>th</sup> Special Forces Group would potentially use beaches and facilities on the SRI Range Complex. The Joint Strike Fighter program will also be located on Eglin AFB and would be expected to replace current flight activities at Eglin AFB. No details have been provided to date as the analysis for these actions is currently being completed. No cumulative analysis is currently possible for this action.

### **4.9 ANALYSIS OF CUMULATIVE IMPACTS**

#### **4.9.1 Soils**

Soil disturbance can have a cumulative impact if a specific episode is compounded by other soil disturbing activities. Of the past, present, and reasonably foreseeable actions at SRI, the training activities, road repair, and offshore dredging would potentially cause erosive episodes. The ALRT project area would only cover a 100-m by 30-m (328-ft by 98-ft) area, and sediments would only be disturbed during set-up and removal activities, which would occur four to five times per year. ALRT activities are not anticipated to increase erosion by any appreciable amount in the SRI area, and no cumulative impacts would occur if recommended Best Management Practices are followed during training, dredging, and road construction activities.

#### **4.9.2 Water Resources**

Localized increases in turbidity can have a cumulative impact when viewed on a regional scale if that increase is compounded by other events with the same end result. Of the past, present and reasonably foreseeable actions at SRI, only the Amphibious Ready Group/Marine Expeditionary Unit (ARG/MEU) amphibious landings and crossings, road repair, and offshore dredging would potentially cause water quality issues. Due to the sporadic and temporary nature of the Proposed Action, ALRT activities are not anticipated to increase turbidity by any appreciable amount in the SRI area, and no cumulative impacts are expected.

#### **4.9.3 Noise**

The cumulative impacts to the noise environment are not expected to be significant. Noise, consisting of acoustic waves, does have additive properties, but the levels on SRI and in nearby waters are not expected to significantly exceed ambient levels.

All of the past, present, and reasonably foreseeable actions have the potential to contribute to the noise environment in the vicinity of SRI. ARG/MEU training involving amphibious vehicles and any 7<sup>th</sup> Special Forces Group training activities involving aircraft or boats have the potential to create noise. However, these activities even combined with the Proposed Action would not be significant enough to impact the baseline noise levels associated with SRI, an area that is currently utilized by numerous military and civilian aircraft and marine vessels.

Dredging activities related to the land restoration projects in Destin and Walton, Bay, and Escambia Counties as well as the SRI land mass restoration project have potential to contribute noise to the environment. Dredging, land mass restoration, and construction all consist of actions that require the use of heavy machinery characterized by mostly diesel driven engine noise. These noise levels will not affect the public due to the distance from SRI to the mainland.

Road repair on the SRI Range Complex would involve noise associated with construction activities as well. Again, the noise levels would not be significant enough to reach the public at decibel levels high enough to cause an adverse impact.

However, because multiple construction/dredging projects may be taking place at the same time in a relatively small area, noise impacts to wildlife on SRI should be considered. Noise associated with the Proposed Action would not add significantly to the noise associated with past, present or future actions.

#### **4.9.4 Biological Resources**

Localized loss of habitat, noise impacts, or direct impacts to species can have a cumulative impact when viewed on a regional scale if that loss or impact is compounded by other events with the same end result. Resources possibly affected in a cumulative manner would be sea turtles, Gulf sturgeon, Santa Rosa beach mice, marine mammals, shorebirds, and wading birds. As discussed in Chapter 4, ALRT actions would lead to temporary habitat alteration and potential noise and direct impacts to these species. However, examination of the potential impacts associated with past, present, and reasonably foreseeable actions discussed above, in

combination with ALRT activities, identified minimal potential for direct impacts or noise impacts to sensitive species, with the implementation of management actions and regulatory requirements, such as sea turtle nest relocation and daily checks of the target area for trapped species. Additionally, only a very small area (100 by 30 m [328 by 98.4 ft]) of habitat would be affected by ALRT activities, resulting in minimal additive impacts with other current and planned actions at SRI.

#### 4.9.5 Socioeconomic Resources

Direct or indirect impacts to socioeconomic resources can have a cumulative impact if that specific impact is joined by other events producing cumulative results on a particular resource. Resources possibly affected in a cumulative manner would be commercial and recreational boating, commercial and recreational fishing, and tourism. Project related activities may impact vessel traffic traveling through Gulf nearshore waters. Barge operations associated with dredging activities in Gulf waters and the operational periods of the Proposed Action would require recreational and commercial boats to avoid only the area immediately surrounding these operations and activities, which could occur up to 1.61 km (1 mi) offshore. As these events would be limited in area of effect and/or duration, the Air Force anticipates minimal impacts to recreational and commercial boaters and to sport and commercial fisheries from past, present, or reasonably foreseeable future actions.

Shoreline and dune restoration would potentially affect a very small percentage of tourists in Okaloosa County for a brief duration. Much of the Eglin-controlled property is off limits to public tourism, and the small portion that does allow free access does not produce direct revenue for Eglin AFB. Land mass restoration would potentially have beneficial effects on commercial shipping and waterway transportation by protecting the GIWW from storm surge episodes. Storm surge can transport large amounts of sand into Santa Rosa Sound, filling shipping channels. Restoring dunes and shorelines would limit the amount of sand transported into the GIWW during hurricanes and tropical storms.

#### 4.9.6 Safety

Only trained professionals would operate heavy machinery, and all personnel would follow appropriate safety guidelines.

A potential cumulative impact would be the exposure of a dredge worker or amphibious vehicle operator to radiation from the ALRT project lasers. Because Test Area A-15 is in a restricted area, the public will not be affected, and spotters will ensure that no other unauthorized personnel are in the area at the time of laser firing. Only ALRT personnel wearing the necessary protective eyewear will be allowed into the vicinity of the Proposed Action.

Additionally, measures are in place to cease the active use of the laser at any time if an unauthorized person or vehicle were to somehow enter the target field. NOTAMS and NOTMARS would be issued as well to inform personnel that these potentially dangerous tests would be taking place in the area and that access would be restricted.

#### **4.9.7 Cultural Resources**

Potential cumulative impacts to cultural resources would not be significant and are not expected to occur as a result of the Proposed Action. Potential impacts to cultural resources primarily include but are not limited to projects with a construction component and heavy vehicle movement and operation. Such actions include road reconstruction/repair, the past ARG/MEU operation, and future ground training operations. Under any of these activities the 96<sup>th</sup> Civil Engineer Group, Cultural Resources Branch would be contacted and proper access/egress and operation points would be determined for heavy equipment and training activities. Consequently, direct impacts to known cultural resources would be avoided. Long-term cumulative effects would be positive concerning the SRI building reconstruction and land restoration due to future protection and stabilization of SRI and associated cultural resources from future hurricanes and other erosive episodes.

Eglin AFB is currently conducting a cultural resource assessment of SRI to determine the status of previously documented sites after several active hurricane seasons in 2004 and 2005.

During land mass restoration, earthmoving and dredging equipment would potentially affect cultural resources. In addition, the removal or disturbance of unconsolidated marine sands from off shore during dredging has the potential to disturb intact archaeological resources. Prior to ground-disturbing activities, the USACE would coordinate with Eglin Cultural Resources to discuss proper access and egress points for earthmoving and dredging equipment.

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## 5. PLANS, PERMITS, AND MANAGEMENT ACTIONS

The following is a list of plans, permits, and management actions associated with the Proposed Action. The need for these requirements was identified by the environmental impact analysis process for this Environmental Assessment (EA) and was developed through cooperation between the proponent and interested parties involved in the Proposed Action. These requirements are, therefore, to be considered as part of the Proposed Action and would be implemented through the Proposed Action's initiation. The proponent is responsible for adherence to and coordination with the listed entities to complete the plans, permits, and management actions.

### 5.1 PLANS, PERMITS, AND OTHER REQUIREMENTS

The State defines the landward boundaries of the State of Florida, in accordance with Section 306(d)(2)(A) of the Coastal Zone Management Act (CZMA), as the entire state of Florida. Federal agency activities potentially impacting the coastal zone are required to be consistent, to the maximum extent practicable, with approved state Coastal Zone Management Programs. Federal agencies make determinations as to whether their actions are consistent with approved state plans. Eglin Air Force Base (AFB) submits consistency determinations to the state for review and concurrence. All relevant state agencies (such as the SHPO for potential impacts to cultural resources) must review the Proposed Action and issue a consistency determination. The Florida Coastal Management Program is composed of 23 Florida statutes, which 11 state agencies and four of the five water management districts administer.

Any components of the Proposed Action that take place within the jurisdictional concerns of the State would require a consistency determination with respect to Florida's Coastal Management Plan (Appendix E).

This project will comply with a Joint Coastal Permit (JCP) Application. Through the JCP, the Environmental Permitting Section of Florida Department of Environmental Protection (FDEP) reviews permit applications to make sure that any potential adverse impacts of the proposed projects have been avoided or minimized.

The 46<sup>th</sup> Test Wing (TW) is conducting an Endangered Species Act (ESA) Section 7 Consultation with the USFWS for potential impacts to threatened and endangered species and critical habitat. The 46<sup>th</sup> TW will comply with the management requirements of the Biological Assessment.

The 46<sup>th</sup> TW is also conducting an ESA Section 7 Consultation, Marine Mammal Protection Act (MMPA) consultation, and an Essential Fish Habitat (EFH) consultation with NMFS for potential impacts to threatened and endangered species, marine mammals, and EFH. The 46<sup>th</sup> TW will comply with the requirements of each of the consultations.

## 5.2 MANAGEMENT ACTIONS

The proponent is responsible for the implementation of the following management actions.

### 5.2.1 Soils and Water Resources

The following management actions would reduce potential impacts to water resources:

- Minimizing disturbance to bottom sediments and beach soils
- Not establishing target fields in wetlands
- Minimizing ground disturbing activities in floodplains

### 5.2.2 Noise

No management actions are required.

### 5.2.3 Biological Resources

The Advanced Littoral Reconnaissance Technologies (ALRT) program would not affect any beach restoration projects on Santa Rosa Island (SRI). To minimize impacts to sea turtles and other sensitive SRI species, the management actions below would be required as part of the Proposed Action. Many of these requirements are Terms and Conditions from the *Eglin ALRT Testing Biological Opinion* (USFWS, 2004). Sea turtle season at Eglin AFB is 1 May to 31 October.

- If any portion of the ALRT testing would occur during the period from 1 May through 31 October, the Natural Resources Section (NRS) would conduct daily early morning sea turtle surveys. Nesting surveys at Test Area A-15 would begin 7 days prior to ALRT activities, or by 1 May, whichever is later. Nesting surveys would continue through the end of the activities or through 1 September, whichever is earlier. After this period, the NRS would continue to check nests based on anticipated hatching dates.
- The NRS would relocate all sea turtle nests in the Test Area A-15 area to adjacent beaches at least 15 m (50 ft) from the boundaries of the test site, in accordance with the terms and conditions of the previous biological assessment. All nests will be re-located between Index Nesting Beach Survey marker 3.5 and 4.5 if testing is conducted during the nesting season. Nest relocations associated with the ALRT project would cease when project activities no longer threatened nests.
- During sea turtle season, personnel would install a fence (e.g., silt fence) to direct sea turtles away from the common and simulated concertina wire, structural sea urchins, and tanglefoot wire on the beach onto adjacent beaches. This silt fence would serve to minimize but not eliminate potential take to nesting sea turtles. Section 7 consultations would determine the amount and extent of take.
- On the nights that ALRT activities would be conducted, the NRS would provide location information to test participants concerning each sea turtle nest within 0.8 km (0.5 mi) of Test Area A-15 that was at or past incubation day 60.

- Participants would avoid marked sea turtle nests by at least 15 m (50 ft).
- On the nights that ALRT activities would be conducted, the east and west boundaries of Test Area A-15 would be clearly posted, marked on the ground, or provided on maps to participants.
- On the nights that ALRT activities would be conducted, one testing participant would serve as an observer to be responsible for identifying signs of nesting or hatchling sea turtles. The observer would be responsible for assuring that the project participants did not interfere with nesting sea turtles, impede hatchling sea turtles from emerging from the nest and crawling to the Gulf of Mexico, or obscure signs of sea turtle activity.
- If an adult or hatchling sea turtle was observed on the beach while the ALRT testing was ongoing, testing would stop until the turtle left the beach. Participants would remain as quiet as possible allowing the turtle to continue activities. All effort would be made not to obscure the turtle crawl or nest area.
- Between 1 May and 31 October, Eglin would provide test participants a 24-hour contact who would be available to respond to emergencies related to harm or injury to sea turtles and to answer questions related to endangered species and the testing activities. Point of contact would be Bob Miller, 1-888-328-7351, or Bruce Hagedorn, 1-888-879-5420.
- Between 1 May and 15 November, all direct lighting of the beach and nearshore waters associated with the ALRT activities would be limited to Test Area A-15. If all sea turtle nests have hatched or been evaluated within 0.8 km (0.5 mi), this restriction is not required.
- Between 1 May and 31 October all set up and take down activity associated with ALRT testing on the beach and in the surf zone would occur during daytime hours and after the morning sea turtle survey is completed.
- Participants would receive conditions and restrictions to the ALRT activities.
- Eglin would provide an educational overview for the ALRT participants in the form of a handbook.
- No equipment or vehicle use would occur on or within vegetated dune habitat that is 1.5 m (5 ft) tall or taller.
- No project participants would traverse dunes, vegetated or unvegetated, that are 1.5 m (5 ft) tall or taller.
- If habitat restoration is necessary, it would be designed and conducted to minimize impacts to sea turtles in accordance with FDEP guidelines detailed in the *ALRT Biological Opinion Terms and Conditions*.

#### 5.2.4 Safety

The following management actions would reduce potential impacts resulting from safety concerns:

- All personnel would wear laser goggles, as needed for unsafe radiation levels.

- Lasers would only actively radiate directly over the target field, including a 30-m (98-ft) buffer zone around the target field.
- Ground and surface personnel would clear the test area before granting permission to actively fire the laser.
- Ground and marine spotters would be used to continuously support beach, sound, highway, and Gulf range clearance.
- Notices to Airmen (NOTAMs) and Notices to Mariners (NOTMARS) would be issued prior to any test activities.
- In the event of a hurricane or named storm event, maximum effort would be made to remove all barricades, obstacles and mines in both the water and on the beach prior to storm landfall.
- Proponent would do a thorough inventory control sweep of the area during and after the project so no shapes would be orphaned and left in the field.

## 5.2.5 Cultural Resources

The following management actions would reduce potential impacts to cultural resources:

- The U.S. Army Corps of Engineers (USACE) and construction contractors would avoid archaeological sites. Eglin AFB Cultural Resources would construct or place barriers such as fences or marking sites in the field and on maps to identify areas to avoid.
- When avoidance of sites is not feasible, Eglin AFB Cultural Resources and the Florida SHPO would employ alternative means (for example, data recovery) to reduce or eliminate the potential for impact to cultural resources.
- Areas where artifacts can be seen on the surface of the ground would be avoided. Artifacts include any man-made object, including glass, nails, bricks, ceramics, arrowheads, metal, and structures such as fence posts and building remnants.
- Digging, construction, vehicular traffic, or other ground-disturbing activities in the direct vicinity of historic properties listed, eligible or potentially eligible for listing on the NRHP would be avoided. If digging, vehicular traffic, or other ground-disturbing activities are to occur in such an area, workmen would notify Eglin AFB Cultural Resources. Cultural Resources staff would clearly mark or identify those areas listed as eligible or potentially eligible.

## 6. LIST OF PREPARERS

### SCIENCE APPLICATIONS INTERNATIONAL CORPORATION (SAIC)

1140 Eglin Parkway  
Shalimar, FL 32579

Name/Title	Project Role	Qualifications
<b>Brad Boykin</b> Biologist B.S. Biomedical Science M.S. Biotechnology	Author	3 years environmental science
<b>Stephanie Hiers</b> Environmental Scientist M.S. Conservation Ecology B.S. Biology	Author	8 years environmental science
<b>Kelly Knight</b> Environmental Scientist B.S. Biology	Author	1 year environmental science
<b>Jason Koralewski</b> NEPA/Archaeologist M.A. Anthropology M.L.S. Archaeology B.A. Anthropology	Author	12 years cultural resources and environmental science
<b>Jamie McKee</b> Environmental Scientist B.S. Marine Biology	Technical Reviewer	19 years environmental science with experience in freshwater, estuarine and marine applications
<b>Mike Nunley</b> Marine Scientist Environmental Scientist M.S. Marine Ecology B.A. Biology	Project Manager/Author	8 years environmental science
<b>Robert Penrose</b> Environmental Scientist/GIS B.S. Biology	GIS	2 years environmental science and GIS
<b>Kristin Smith</b> Environmental Scientist B.A. Biology, Minor in Mathematics M.S. Biology	Author	1 year environmental science

**List of Preparers**

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**APPENDIX A**

**JOINT COASTAL PERMIT**  
**(FDEP AND USACE)**





**JOINT APPLICATION  
FOR  
JOINT COASTAL PERMIT**

**AUTHORIZATION TO USE  
SOVEREIGNTY SUBMERGED LANDS  
  
FEDERAL DREDGE AND FILL PERMIT**

**Advanced Littoral Reconnaissance Technologies (ALRT) Project  
Eglin Air Force Base**

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION  
U.S. ARMY CORPS OF ENGINEERS

DEP Form 73-500 (05/17/07)



## JOINT APPLICATION FOR JOINT COASTAL PERMIT / AUTHORIZATION TO USE SOVEREIGNTY SUBMERGED LANDS / FEDERAL DREDGE AND FILL PERMIT

### APPLICATION INSTRUCTIONS

**MAIL TO:**

Florida Department of Environmental Protection  
Bureau of Beaches and Coastal Systems  
3900 Commonwealth Boulevard - Mail Station 300  
Tallahassee, Florida 32399-3000

**STREET ADDRESS:**

Capital Center  
5050 West Tennessee Street, Building B  
Tallahassee, Florida  
(For Hand Delivery Only. Do Not Mail to this address.)

**INTRODUCTION**

Attached is a Joint Coastal Permit application form and a Notice of Receipt of Application form. Use of these forms is required when applying for the following:

- 1) a Joint Coastal Permit for activities that extend onto sovereignty lands of Florida, seaward of the mean high-water line and are likely to have a material physical effect on the coastal system or natural beach and inlet processes, pursuant to Sections 161.021, 161.041 and 161.055, F.S., and Rule 62B-49.001, F.A.C.;
- 2) authorization to use sovereign submerged lands in association with a Joint Coastal Permit; and
- 3) a federal dredge and fill permit for activities outlined above.

**COPIES / APPLICATION FEES**

Submit one (1) completed application form with original signature, along with the certified drawings and all the supporting materials requested on the form. Whenever submitting information for your application (original application or additional information), the package must include the original paper copy, two (2) additional paper copies and two (2) electronic copies of all submitted items. Submit the entire application package (1 original set, 2 paper copies and 2 electronic copies) to the Department along with the appropriate application fee. A spreadsheet is available on the Bureau's web page to aid in calculating the correct application fee.

**DISTRIBUTION TO THE U.S. ARMY CORPS OF ENGINEERS**

When activities are proposed in, on or over wetlands or other surface waters, the Department shall forward a copy of the application to the United States Army Corps of Engineers (USACE). The USACE will advise you of any additional information that may be required to complete the federal dredge and fill portion of the permit application. The information requested in this application form may be more than required to make a complete application to the USACE. However, it is useful and may be essential for subsequent evaluation. **Please provide measurements in both English units and metric equivalents for projects that require a federal permit.**

**CONSULTATION**

Applicants are encouraged to consult with Department staff prior to submittal of the formal application. If you have any questions, please consult with the staff of the Department of Environmental Protection (DEP), Bureau of Beaches and Coastal Systems prior to submittal of the formal application.

**The applicant is required to complete the "NOTICE OF RECEIPT OF APPLICATION FOR JOINT COASTAL PERMIT" form on the last page of the application package. Failure to provide this information will delay processing.**

NOTE: The information listed in this application package is not intended to be all-inclusive. Additional information may be requested by the reviewing agency in order to complete your application.

DEP Form 73-500 (05/17/07)



**JOINT APPLICATION FOR JOINT COASTAL PERMIT / AUTHORIZATION TO USE  
SOVEREIGNTY SUBMERGED LANDS / FEDERAL DREDGE AND FILL PERMIT**

**FOR AGENCY USE ONLY**

ACOE Application Number:	DEP Application Number:
Date Application Received:	Date Application Received:

1. Name of authorized agent for permit application (if applicable) <b>Mr. Henry Birdsong (Hank)</b>		Mailing Address <b>700 Range Road, Bldg. 592 Eglin AFB, FL 32542</b>	
City <b>Eglin Air Force Base</b>	State <b>Florida</b>	Zip Code <b>32542</b>	Telephone <b>850-882-7655</b>
E-mail <b>hank.birdsong@eglin.af.mil</b>		Fax <b>850-882-7675</b>	
2. Name of applicant <b>Colonel Dennis D Yates, USAF, Base Civil Engineer</b>		Mailing Address <b>501 DeLeon Street, Suite 102</b>	
City <b>Eglin Air Force Base</b>	State <b>Florida</b>	Zip Code <b>32542</b>	Telephone <b>850-882-2876</b>
E-mail		Fax	

3. Name of activity

Eglin Air Force Base – Advanced Littoral Reconnaissance Technologies (ALRT) Project

4. Location of activity, including dredging, filling and construction sites (use additional sheets, if needed):

County(ies)      **Santa Rosa / Okaloosa**  
 Section(s)      **00**      Township      **2S**      Range      **24**  
 Section(s)      \_\_\_\_\_      Township      \_\_\_\_\_      Range      \_\_\_\_\_  
 Section(s)      \_\_\_\_\_      Township      \_\_\_\_\_      Range      \_\_\_\_\_  
 Center of project: Latitude      **30°23'23.224" N**      Longitude      **86°48'196" W**  
 At corners or ends of project: State Plane Coordinates      **LJ 1241167.17, 512975.3    LR 1242122.25, 512017.52**  
 DNR reference monument(s)      **V5 10 and V5 16**

Land Grant name, if applicable:

Tax Parcel Identification Number:      **00-2S-24-0000-0001-0000**

Street address, road, or other location:      **Santa Rosa Island**

City, Zip Code if applicable:      **Eglin Air Force Base**

5. Describe in general terms the proposed activity including any phasing. Please provide measurements for projects that require a federal permit in both English units and metric equivalents.

**The proposed action is to collect imagery over mine-like objects, obstacles, and barricade targets in a realistic environment on the beach, in the sound, and in the surf zone. The ALRT project involves the testing of various passive sensors and active sensors combined with laser illuminators in inland environments, and littoral waters from several possible systems and airframes.**

**The proposed action calls for no more than five tests per year.**

6. Are you requesting any exemptions?  YES  NO If yes, provide explanation and cite rule number(s)

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7. Describe the purpose and need of the proposed activity including any public benefits.

The proposed action will provide for testing and evaluation of equipment necessary to ensure national security.

Check here if information is continued on an attached sheet.

8. Indicate the requested duration of your permit:

3 years (experimental)

5 years (new construction)

10 years (maintenance)

9. Indicate the type of sovereignty submerged lands authorization being requested.

Letter of Consent  Public Easement  Private Easement  Lease  Other: \_\_\_\_\_

Also indicate the requested duration of this sovereignty submerged lands authorization: \_\_\_\_\_ years.

10. Please identify by number any JCP / DBS / Wetland Resource / ERP / ACOE Permits pending, issued or denied for projects at the location, and any related enforcement actions.

Agency	Date	No. / Type of Application	Action Taken
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Check here if information is continued on an attached sheet.

To be provided.

11. Have you obtained approval from the Department of State, Division of Historical Resources?  YES  NO

If yes, provide a copy of the letter of approval.

Due to the potential for cultural resources at Test Area A-15 on the beach and in the water, informal consultation with the State Historic Preservation Officer (SHPO) was initiated. The SHPO was made aware of the undertaking during an informal discussion in Eglin's Cultural Resources office and agrees that a formal consultation would not be necessary. The SHPO will have an opportunity to comment and address any concerns during the Clearinghouse Review.

12. Has an Erosion Control Line been established pursuant to Sections 161.141 - 161.211, F.S.?  YES  NO

If yes, please provide evidence that the ECL has been recorded and show the location of the established ECL on all appropriate drawings.

**INFORMATION FOR ASSESSMENT OF SOVEREIGNTY SUBMERGED LANDS APPLICATION:****SUBMIT THE FOLLOWING ITEMS AS ATTACHMENTS:**

**Note:** A justification or explanation is required when requesting a waiver of any of the items below. Waiver is defined as relinquishing the requirements for the cited information.

Attached	To be Provided	Waiver Requested	Not Applicable
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13. A copy of the Division of State Lands title determination for submerged lands or other State-owned lands. If you do not have title determination, Department staff will request that the Division of State Lands conduct a title check while your application remains incomplete.
14. Satisfactory evidence demonstrating that the applicant has sufficient control and interest in the riparian upland property, as described in Subsection 18-21.004 (3)(b), Florida Administrative Code. Governmental entities that qualify for the waiver or deferral outlined in this rule must provide supporting documentation in order to be eligible. If the applicant is not the property owner, then authorization from the property owner for such use must be provided.
15. A detailed statement describing the existing and proposed upland uses and activities. For projects sponsored by a local government, indicate whether or not the facilities will be open to the general public. Provide a breakdown of any user fees that will be assessed to the general public and indicate whether or not such user fees will generate revenue or will simply cover costs associated with maintaining the facilities.
16. **The information in this item is only required if you are applying for a sovereignty submerged lands easement or lease.** A list of the names and addresses of owners of all riparian property within 1,000 feet (and within a 500 ft radius) of the proposed sovereignty submerged lands easement or lease site from the latest county tax roll. If the property is under cooperative or condominium ownership, the name and mailing address of the cooperative or condominium association will be adequate. This would not apply to off-shore leases or easements that are not located within 1,000 feet of the shoreline.
17. A legal property description and acreage of any sovereign submerged land that would be encompassed by the requested lease or easement, plus two (2) prints of a survey prepared, signed and sealed by a person properly licensed by the Florida State Board of Land Surveyors.

**18. SIGNATURE(S)**

- A. By signing this application form, I am applying, or I am applying on behalf of the applicant, for the permit and any proprietary authorizations identified above, according to the supporting data and other incidental information filed with this application. I am familiar with the information contained in this application and represent that such information is true, complete and accurate. I understand this is an application and not a permit, that work prior to approval is a violation, and any permit issued or proprietary authorization issued pursuant thereto, does not relieve me of any obligation for obtaining any other required federal, state, water management district or local permit prior to commencement of construction. I agree, or I agree on behalf of my corporation, to operate and maintain the permitted system unless the permitting agency authorizes transfer of the permit to a responsible operation entity. I understand that knowingly making any false statement or representation in this application is a violation of Section 373.430, F.S. and 18 U.S.C. Section 1001.

**Mr. Henry Birdsong (Hank), Eglin Air Force Base**

\_\_\_\_\_  
Typed / Printed Name of Applicant (If no Agent is used) or Agent (If one is so authorized below)

\_\_\_\_\_  
Signature of Applicant / Agent

\_\_\_\_\_  
Date

\_\_\_\_\_  
Name of political subdivision, municipality, or business entity and title of person signing on its behalf, if applicable

**AN AGENT MAY SIGN ABOVE ONLY IF THE APPLICANT COMPLETES THE FOLLOWING:**

- B. I hereby designate and authorize the agent listed above to act on my behalf, or on behalf of my corporation, as the agent in the processing of this application for the permit and / or proprietary authorization indicated above; and to furnish, on request, supplemental information in support of the application. In addition, I authorize the above-listed agent to bind me, or my corporation, to perform any requirement which may be necessary to procure the permit or authorization indicated above. I understand that knowingly making any false statement or representation in this application is a violation of Section 373.430, F.S. and 18 U.S.C. Section 1001.

**Colonel Dennis D Yates**

\_\_\_\_\_  
Typed / Printed Name of Applicant

\_\_\_\_\_  
Signature of Applicant

\_\_\_\_\_  
Date

**US Air Force, Eglin Air Force Base**

\_\_\_\_\_  
Name of political subdivision, municipality, or business entity and title of person signing on its behalf, if applicable

Please Note: The Applicant's original signature (not a copy) is required.

**PERSON AUTHORIZING ACCESS TO THE PROPERTY MUST COMPLETE THE FOLLOWING:**

- C. I either own the property described in the application or I have legal authority to allow access to the property, and I consent, after receiving prior notification, to any site visit on the property by agents or personnel from the Department of Environmental Protection and the U.S. Army Corps of Engineers necessary for the review and inspection of the proposed project specified in this application. I authorize these agents or personnel to enter the property as many times as may be necessary to make such review and inspection. Further, I agree to provide entry to the project site for such agents or personnel to monitor permitted work if a permit is granted.

**Colonel Dennis D Yates**

\_\_\_\_\_  
Typed / Printed Name of Applicant

\_\_\_\_\_  
Signature of Applicant

\_\_\_\_\_  
Date

**US Air Force, Eglin Air Force Base**

\_\_\_\_\_  
(Name of political subdivision, municipality, or business entity and title of person signing on its behalf, if applicable)

## INFORMATION FOR ASSESSMENT OF IMPACTS TO THE COASTAL SYSTEM

## SUBMIT THE FOLLOWING ITEMS AS ATTACHMENTS:

Note, a justification or explanation is required when requesting a waiver of any of the items below. Waiver is defined as relinquishing the requirements for the cited information.

Attached	To be Provided	Waiver Requested	Not Applicable
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19. Written evidence, provided by the appropriate governmental agency having jurisdiction over the activity, that the proposed activity, as submitted to the Department, is consistent with the state-approved Local Comprehensive Plan.
20. Topographic and bathymetric survey drawings of the proposed project site(s), including profiles and a contour map that reflect conditions within the past six (6) months, in accordance with Rule 62B-41.008(1)(h), F.A.C. Drawings shall meet the State's minimum technical standards and shall be signed and sealed by the professional surveyor, duly registered pursuant to Chapter 472, Florida Statutes, who performed the survey.
21. A description of how the boundaries of any wetlands affected by the project were determined. If the wetland boundaries have ever been delineated through a jurisdictional declaratory statement, a formal wetland determination, a formal determination, a validated informal determination or a revalidated jurisdictional determination, provide the identifying number of the document.
22. An engineering description and measured-drawings of any existing structures on the site that may be directly or indirectly affected by, or that may directly or indirectly affect, the proposed activity. This shall typically include shore protection structures such as groins, utility or stormwater outfalls, including subgrade structures, and any derelict structures such as remnant walls or pilings.
23. Complete sets of construction plans and specification for the proposed activity, certified by an engineer duly registered pursuant to Chapter 471, Florida Statutes. The plans shall clearly distinguish between existing and proposed structures and grades, and shall include the following:
- a. Plan view of the proposed activity depicting the mean high-water line, any easement boundary and the erosion control line (if applicable) within the area of influence of the proposed activity. Identify the boundaries of significant geographical features (e.g., channels, shoals) and natural communities (e.g., submerged grass beds, hardbottom or mangroves) within the area of influence of the activity. Include a north arrow and a scale bar on each drawing.
  - b. A sufficient number of cross-section views of the proposed activity depicting the slopes, the mean high-water line, any easement boundary and the erosion control line (if applicable) within the area of influence of the proposed activity. Identify the boundaries of significant geographical features and natural communities in the area of influence of the proposed activity. Elevations indicated on the cross-sections shall be referenced to the North American Vertical Datum of 1988 (NAVD 88).
  - c. Details of construction, including materials and general construction procedures and equipment to be used (e.g., construction access, dredging method, dredged material containment, pipeline location).
24. In addition to the full-size drawings requested above, the information required under Paragraphs (20), (22) and (23) above shall be provided on 8 1/2-inch by 11-inch paper, certified by an engineer duly registered pursuant to Chapter 471, Florida Statutes. Each drawing shall include an accurate scale or dimensions, and all information shown on the drawing shall be clearly legible.

	Attached	To be Provided	Waiver Requested	Not Applicable
25. An aerial photograph or map with a scale of 1" = 200', showing: the project boundaries, DNR Reference Monument locations, major county landmarks, boundaries of significant natural communities (e.g., submerged aquatic vegetation, hardbottom or mangroves) and special aquatic or terrestrial sites (parks, sanctuaries, refuges, Outstanding Florida Waters, aquatic preserves, etc.) within the project boundary and a minimum of 1,000 feet in both shore parallel directions of the project boundary.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. A proposed construction schedule.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Permit applications for excavation or fill activities shall include the following detailed information concerning the material to be excavated and the existing or native material at the beach fill site:				
a. Site plans showing the location of all core borings and the boundaries of the area to be excavated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b. Core boring logs of all cores taken throughout the area to be excavated and surrounding area. Logs should extend at least two feet below the proposed bottom elevation. The depth of each visible horizon in the log should be reported relative to NAVD (88) and the material in each stratum classified according to grain size.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c. Particle size and color analysis of the sediment. Gradation curves, frequency distribution curves and data analysis sheets should be produced from sieve analysis of each stratum in the core. Grain size distribution must be determined down to the standard unit 230 sieve size. Color analysis of moist sediment should use Munsell system of hue, value and chroma.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d. Carbonate content and percent organics by dry weight from representative stratum in each core. Chemical analyses shall be required if there is reason to suspect that the sediments are contaminated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e. Representative physical samples and particle size, color and carbonate content of the existing or native material at the beach fill site.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f. A sediment QA/QC plan that will ensure that the sediment to be used for beach restoration or nourishment will meet the standards set forth in paragraph 62B-41.007(2)(j), F.A.C.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<p>Submit all geotechnical information in electronic file format suitable for input to the Department's Reconnaissance Offshore Sand Search (ROSS) database. The data may be submitted in Excel, Access or gINT files. The MS Access Front End Loader is available on the ROSS website <a href="http://ross.urs-tally.com/">http://ross.urs-tally.com/</a>. Visit the gINT website <a href="http://www.gintsoftware.com/">http://www.gintsoftware.com/</a> for downloads necessary for the ROSS data structure. Submit electronic geo-referenced maps (shapefiles and metadata) of borrow area boundaries, core boring locations, and seismic track lines with time stamps and shot points, and .pdf files of seismic images with time stamp annotations.</p>				
28. Using an established natural community classification system, describe each natural community within the area of influence of the proposed activity and include:				
a. Acreage.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Identification of the flora and fauna to the lowest taxon practicable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Characterization of dominant and important flora and fauna and estimates of percent biotic cover.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Sampling locations, date of sampling or measurements and methods used for sampling.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Attached	To be Provided	Waiver Requested	Not Applicable
29. Detailed information on season of occurrence, density, and location of threatened or endangered species whose range occurs within the proposed activity.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Results of available wildlife surveys that have been conducted on the site, and any comments pertaining to the proposed activity from the Florida Fish and Wildlife Conservation Commission.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. A current Biological Opinion from the U.S. Fish and Wildlife Service or the National Marine Fisheries Service, when the Florida Wildlife Conservation Commission has determined that the proposed project will result in a take of marine turtles, which could not be authorized without an incidental take determination under federal law.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. A general description of the use and importance of the area influenced by the proposed project for all recreational activities, including (but not limited to) fishing, diving, surfing and bird watching. Also include a general description of any commercial fishing in the area.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Analysis of the expected effect of the proposed activity on the coastal system including but not limited to:				
a. Analysis of the expected physical effect of the proposed activity on the existing coastal conditions and natural shore and inlet processes. The analysis should include a quantitative description of the existing coastal system, the performance objectives of the proposed activity, the design parameters and assumptions, relevant computations, validation of the results and the data used in the analysis.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Analysis of the compatibility of the fill material with respect to the native sediment at the placement site. The analysis should include all relevant computations, the overfill ratios, and superimposed graphs of the cumulative grain-size distribution and the frequency distribution of the fill material over the data for the existing or native sediment at the placement site. Provide computations of borrow area volume and composite fill material characteristics (mean grain size and sorting, percent carbonate content) in an electronic spreadsheet.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c. Demonstration of consistency with the Department's strategic beach management plan or an inlet management plan in accordance with Rule 62B-41.005(15), F.A.C. If the proposed project is not included in an inlet management plan the applicant will provide the information specified in Rule 62B-41.008(1)(m), F.A.C.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d. Analysis of how water quality and natural communities would be affected by the proposed project. Provide graphic representation (depiction) of the area of direct and secondary influence of the proposed activity and delineate the natural communities within that area. All required surveys shall be representative of conditions existing at the time of submittal. Surveys of submerged aquatic vegetation (SAV) shall be conducted in the field during the growing season for a given climatic region such that they capture the full areal extent and biomass of the SAV community. Species composition and spatial distribution shall also be addressed by the survey. Estimate the affected acreage of each impacted community.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Note: If a mixing zone is proposed, provide a narrative description and graphic representation of the mixing zone. Identify any areas within the proposed mixing zone that contain significant submerged resources. Explain why the size of the proposed mixing zone is the minimum necessary to meet water quality standards and provide justification for that size.</i>				
e. Reasonable assurances that a regulated activity will not cause unacceptable cumulative impacts pursuant to Rules 40X-4.302(1)(b) and 62B-41.002(19)(b), F.A.C.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Attached	To be Provided	Waiver Requested	Not Applicable
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34. Describe the location and details of the erosion, sediment and turbidity control measures to be implemented during each phase of construction and all other measures used to minimize adverse effects to water quality.
35. Describe any methods proposed to protect threatened or endangered species.
36. A written statement providing the necessity and justification for the potential impacts to the coastal ecosystem that may be caused by the proposed coastal construction.
37. A narrative description of any proposed mitigation plans, pursuant to Rule 62-345, F.A.C., including purpose, a comparison between the functions of the impact site to the mitigation site, maintenance, monitoring, estimated cost, construction sequence and techniques. For proposed artificial reefs, indicate the water depth, depth of sand overlying bedrock, proposed relief and materials (type, size and shape).
38. An analysis of available alternatives to the proposed coastal construction, pursuant to Rules 62B-41.005(17) and 40X-4.301(3), F.A.C. (where "X" represents "C", "D" or "E" for the corresponding Water Management District), that would minimize adverse impacts to the coastal system. Discuss any related effects on the coastal system.
39. A fee, as set forth in Rule 62B-49.006, F.A.C. A spreadsheet is available on the Bureau's web page to aid in calculating the correct application fee. In order to calculate the fee, please provide the following: the acreage of proposed filling seaward of the MHW line; the acreage of proposed dredging; the cubic yardage of fill to be placed on the beach (above and below the MHW line); the cubic yardage of material to be dredged from an inlet and then placed either in an upland or offshore disposal site; the length of rigid coastal structures (groins, breakwaters, jetties, seawalls and revetments); and the number of inlet-related structures (new channels, sand traps and bypassing plants).

*Note: Additional information may be required by statute or rule, or if found by staff to be reasonably necessary for proper evaluation of the application under applicable statutory and rule criteria.*

Specific Authority 161.041, 253, 258, 370.021, 370.12 and Part IV of 373, Florida Statutes.



**JOINT APPLICATION FOR JOINT COASTAL PERMIT AND AUTHORIZATION TO  
USE SOVEREIGNTY SUBMERGED LANDS**

**NOTICE OF RECEIPT OF APPLICATION FOR JOINT COASTAL PERMIT**

This information is required in addition to that required in other sections of the application. Please submit three (3) paper copies and two (2) electronic copies of this notice of receipt of application, including the attachments and information listed below. Please submit all information on 8 ½" x 11" paper.

Project Name: Eglin Air Force Base – Advanced Littoral Reconnaissance Technologies (ALRT) Project

County: Santa Rosa/Okaloosa Counties

Owner: Eglin Air Force Base

Applicant: Colonel Dennis D Yates, US Air Force, Base Civil Engineer

Applicant's Address: 501 DeLeon Street, Suite 102  
Eglin Air Force Base, Florida 32542

1. Indicate the activity boundaries on a USGS quadrangle map. Attach a location map showing the boundary of the proposed activity. The map should also contain a north arrow and a graphic scale; show Section(s), Township(s), and Range(s); DNR reference monuments; political boundaries; and identifiable landmarks. This map must be of sufficient detail to allow a person unfamiliar with the site to find it.

See attached data

2. Attach drawings (plan and section views) that clearly show the proposed construction or other activities. Use multiple sheets, if necessary. Use a scale sufficient to show the location and type of work.

See attached data

3. Provide the names of all waterbodies and wetlands that would be affected by the proposed project and specify if they are in an Outstanding Florida Water or Aquatic Preserve:

Gulf of Mexico and Santa Rosa Sound

4. Briefly describe the proposed project (such as "beach restoration", "inlet maintenance dredging", "terminal groin", etc.):

The proposed action is to collect imagery over mine-like objects, obstacles, and barricade targets in a realistic environment on the beach, in the sound, and in the surf zone. The ALRT project involves the testing of various passive sensors and active sensors combined with laser illuminators in inland environments, and littoral waters from several possible systems and airframes.

5. Specify the acreage of each natural community type that is proposed to be filled, excavated, or otherwise disturbed or impacted by the proposed activity:

No fill or excavation is being proposed.

6. Provide a brief statement describing any proposed mitigation for impacts to natural communities (attach additional sheets if necessary):

Biologists with specialized training in coastal ecosystems will be on site when the proposed targets are set up and removed. Forested areas, herbaceous wetlands, and seagrass areas will be avoided.

**FOR AGENCY USE ONLY**

Application Name: \_\_\_\_\_

Application Number: \_\_\_\_\_

**Note to Notice Recipient:** The information in this notice has been submitted by the applicant, and has not been verified by the agency. It may be incorrect, incomplete or may be subject to change. The application is available for inspection at the Bureau of Beaches & Coastal Systems, Capital Center, 5050 W. Tennessee St., Building B, Tallahassee, FL and on the Bureau's web page.

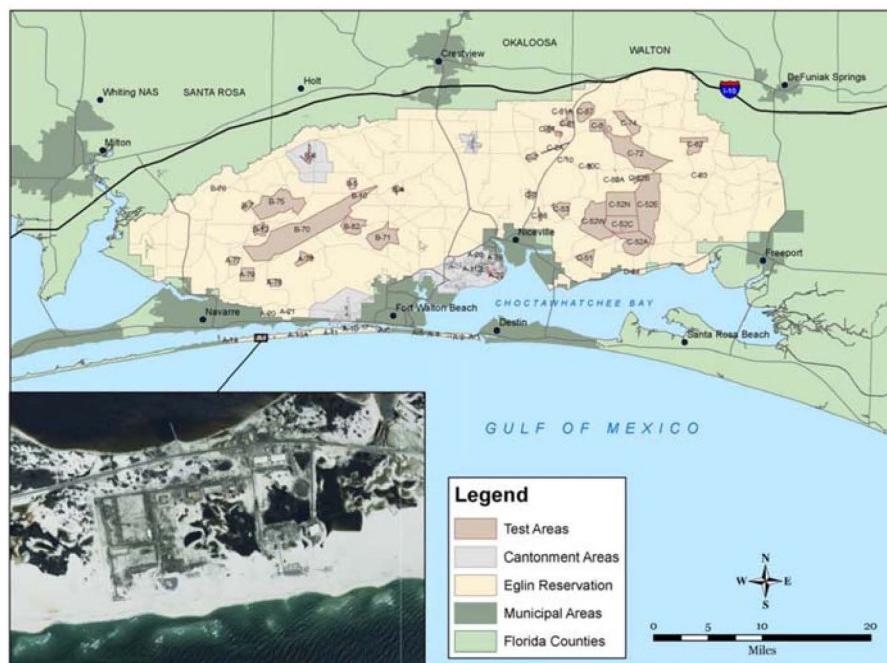
# Eglin ALRT Project Details

***Project Details and Proposed Project Site***

**Test Area A-15**

The Advanced Littoral Reconnaissance Technologies (ALRT) project will offer a cost-effective means to acquire real-time data of battlefield conditions of the littoral region without added risk to personnel or military equipment. The project will provide solutions to current tactical reconnaissance problems and assist in the Global War on Terrorism (GWOT). The test objective of the proposed action is to collect imagery over mine-like objects, obstacles, and barricade targets in a realistic environment on the beach and in the surf zone to characterize algorithm/system performance and provide data for assessment of system performance, data processing, and algorithm development.

Test Area A-15 is a military-controlled area in which the beaches are permanently closed to the public. The in-water areas of the Gulf of Mexico as well as Santa Rosa Sound that will be used as a target field will be temporarily closed to the public, and access will be prevented by ground and marine spotters stationed around the perimeter during tests. Thus, the area will be clear of commercial and recreational boaters, and divers.



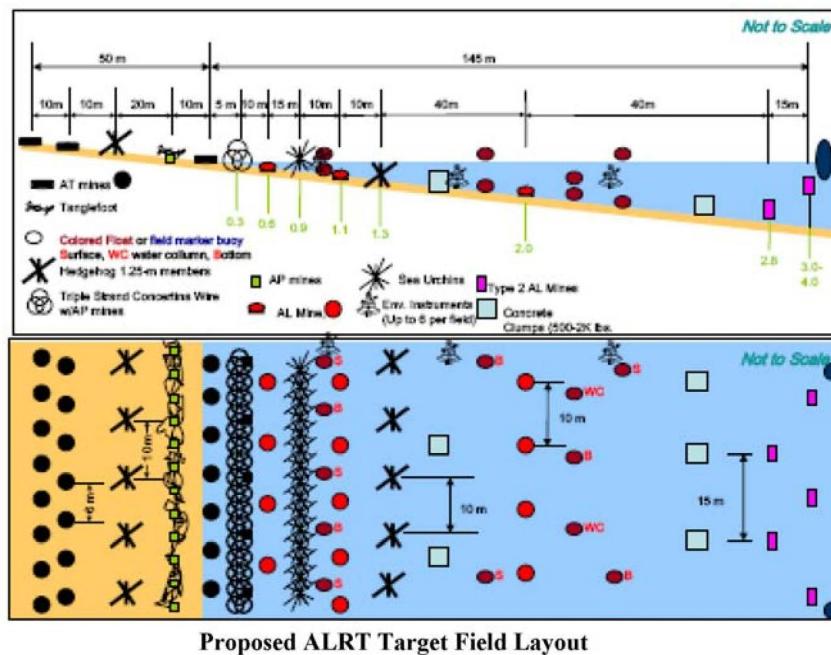
**Proposed Project Location (Test Area A-15) on Santa Rosa Island**

### ***Test Duration***

Each test series would last 1-2 weeks. Personnel would set up the target field over 3 to 4 days, the mission flights would commence, and then personnel would remove the targets from the test site over 2-3 days. The proposed schedule would consist of no more than five tests per year. Biologists with specialized training in coastal ecosystems will be on site when the proposed targets are set up and removed.

### ***Minefield and Obstacle Layouts***

These devices would be positioned near the edge of the water or in the water up to 4 meters (13 ft) deep and anchored primarily with screw anchors or occasionally poles jetted into the sand. To raise and lower some of the heavier targets, a boat/barge with equipment would be necessary. A scuba diver would then secure each one with a screw anchor. To minimize the movement or loss of mines, they would be anchored, tied together, inventoried, and monitored for proper set-up. The minefield and obstacle layouts required for this test includes linear patterned and random scattered mines and obstacles on the beach and in the water. The proposed ALRT target field layout is illustrated below.



***Minefield and Obstacle Details***

Personnel would place inert mines in areas devoid of vegetation to simulate actual mine layouts. Each individual target would be “planted” and its position would be recorded using a hand-held Differential GPS system at the time of installation in the target field.

The inert mines would include M20 inert Anti-Tank (AT), PDM-1M inert Anti-Landing (AL) craft, and PDM-2 inert AL mines (See below). These mine targets are representative of the different materials and types of anti-tank mines encountered in littoral scenarios and are readily available from the current project inventory. They would also provide a representative sampling of the sizes and spectral signatures encountered in real-world scenarios. Obstacles would include floats and buoys, scientific instrumentation, tetrahedrons, hedgehogs, and concrete cubes (4 ft x 4 ft x 4 ft). Barricades would include concertina wire or wire rolls, to simulate concertina wire, tanglefoot barbed wire fencing, and Sea Urchins, which are steel or concrete structures, on the beach only (See below).



**M20 Inert Anti-Tank Mines**



**Hedgehog and Simulated Concertina Wire**

**Attached Responses:**

19. Written evidence, provided by the appropriate governmental agency having jurisdiction over the activity, that the proposed activity, as submitted to the Department, is consistent with the state-approved Local Comprehensive Plan.

**Santa Rosa Island is a military complex under the control of the United States Air Force.  
This includes 17 miles of beach front along the island.**

20. Topographic and bathymetric survey drawings of the proposed project site(s), including profiles and a contour map that reflect conditions within the past six (6) months, in accordance with Rule 62B-41.008(1)(h), F.A.C. Drawings shall meet the State's minimum technical standards and shall be signed and sealed by the professional surveyor, duly registered pursuant to Chapter 472, Florida Statutes, who performed the survey.

**To be provided. Attached drawings have not been certified.**

21. A description of how the boundaries of any wetlands affected by the project were determined. If the wetland boundaries have ever been delineated through a jurisdictional declaratory statement, a formal wetland determination, a formal determination, a validated informal determination or a revalidated jurisdictional determination, provide the identifying number of the document.

**This project site has not formally been delineated for wetlands. Sandy areas devoid of vegetation are the only suitable environments to conduct the ALRT mission. Thus, herbaceous wetlands and ephemeral ponds will be avoided.**

22. An engineering description and measured-drawings of any existing structures on the site that may be directly or indirectly affected by, or that may directly or indirectly affect, the proposed activity. This shall typically include shore protection structures such as groins, utility or stormwater outfalls, including subgrade structures, and any derelict structures such as remnant walls or pilings.

**See attached drawings.**

23. Complete sets of construction plans and specification for the proposed activity

**See attached drawings.**

26. A proposed construction schedule.

**The project will commence once all permitting and authorizations have been received.**

28b. Identification of the flora and fauna to the lowest taxon practicable.

**See attached table in Natural Resources section. FLUCCS Code: 710**

29. Detailed information on season of occurrence, density, and location of threatened or endangered species whose range occurs within the proposed activity.

**See attached table in Natural Resources section.**

30. Results of available wildlife surveys that have been conducted on the site, and any comments pertaining to the proposed activity from the Florida Fish and Wildlife Conservation Commission.

**Eglin AFB conducts numerous wildlife surveys of Santa Rosa Island. See attached table in Natural Resources section for additional information.**

31. A current Biological Opinion from the U.S. Fish and Wildlife Service or the National Marine Fisheries Service, when the Florida Wildlife Conservation Commission has determined that the proposed project will result in a take of marine turtles, which could not be authorized without an incidental take determination under federal law.

**To be provided.**

34. Describe the location and details of the erosion, sediment and turbidity control measures to be implemented during each phase of construction and all other measures used to minimize adverse effects to water quality.

**The proposed action would consist of no more than five tests per year. Any impacts are expected to be minor and temporary.**

35. Describe any methods proposed to protect threatened or endangered species.

**Biologists with specialized training in coastal ecosystems will be on site when the proposed targets are set up and removed.**

36. A written statement providing the necessity and justification for the potential impacts to the coastal ecosystem that may be caused by the proposed coastal construction.

**The proposed action will provide for testing and evaluation of equipment necessary to ensure national security. Any impacts are expected to be minor and temporary.**

38. An analysis of available alternatives to the proposed coastal construction, pursuant to Rules 62B-41.005(17) and 40X-4.301(3), F.A.C. (where "X" represents "C", "D" or "E" for the corresponding Water Management District), that would minimize adverse impacts to the coastal system. Discuss any related effects on the coastal system.

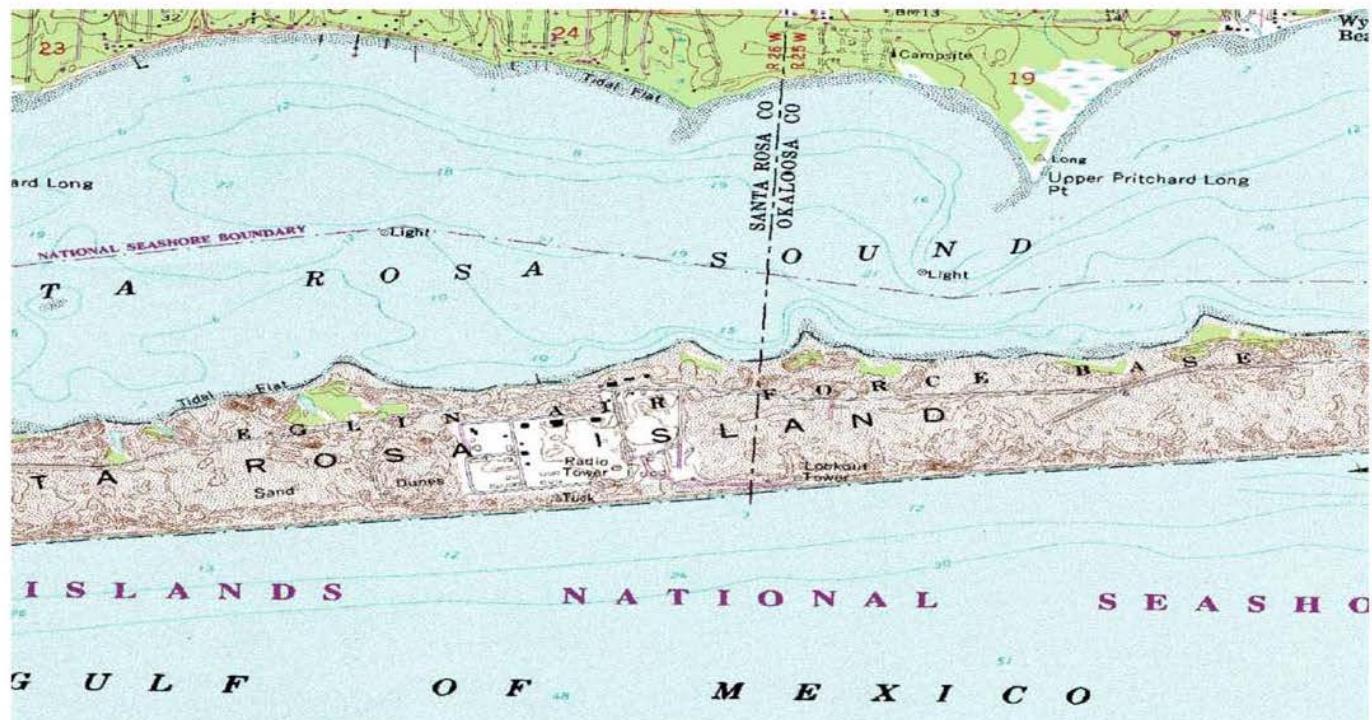
**Alternatives to the proposed action have been addressed in the ALRT Environmental Assessment. Any impacts are expected to be minor and temporary. Detailed information is provided in the ALRT EA.**

39. A fee, as set forth in Rule 62B-49.006, F.A.C.

**The US Air Force would like to request that the FDEP calculate the appropriate fee required for this JCP application.**

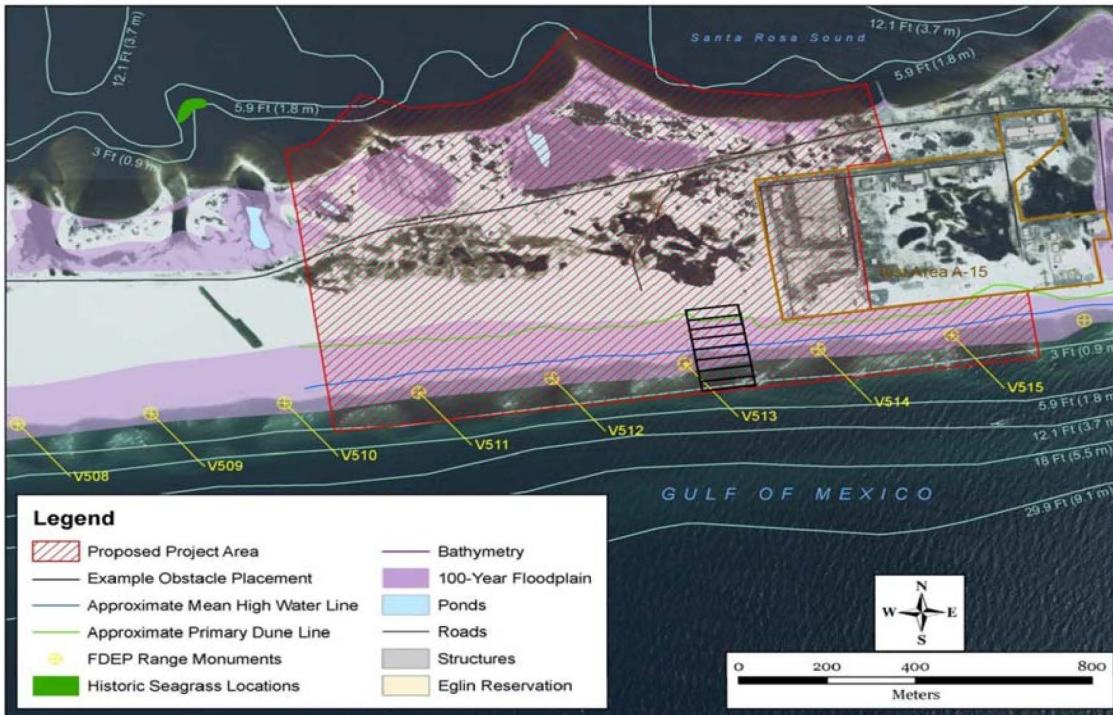
# Eglin ALRT Project Aerials





United States Geological Survey (USGS) Quad Sheet for Santa Rosa Island

USGS Quad Sheet: Navarre, Florida - Section: 00 Township: 02S Range: 24W  
Santa Rosa/Okaloosa Counties, Lon: 86°48.196' W. Lat: 30°23.23.224' N



Proposed ALRT Target Areas at Test Area A-15

# Eglin ALRT Natural Resources

### ***Outstanding Natural Areas/Coastal Protection Areas***

Santa Rosa Island is considered an outstanding natural area based on the excellent condition of much of its beach dune, coastal grassland, coastal interdunal swale, mesic flatwood, and scrub communities. The island also supports a number of populations of the federally listed perforate reindeer lichen. Based on a 1992 Florida Natural Areas Inventory (FNAI) report on coastal upland communities, coastal protection areas were informally designated on Santa Rosa Island.

### ***Plant and Animal Species of the Proposed Project Site***

The following tables provide information for the plant and animal species that inhabit the ecological association of proposed project site (Test Area A-15).

**Plant Species Commonly Found in the Ecological Associations of Eglin Beach Resources**

<b>Beach Dune</b>		<b>Scrub</b>	
Sea oats	<i>Uniola paniculata</i>	Rosemary	<i>Ceratiola ericoides</i>
Sea rocket	<i>Cakile constricta</i>	Saw palmetto	<i>Serenoa repens</i>
Beach elder	<i>Iva imbricata</i>	Slash pine	<i>Pinus elliotti</i>
Evening primrose	<i>Oenothera humifosa</i>	Scrub oaks	<i>Quercus geminata, Q. myrtifolia</i>
Milk pea	<i>Galactia microphylla</i>	Lichens	<i>Cladonia leporina, Cladina evansii</i>
Godfrey's goldenaster	<i>Chrysopsis freyi</i>	Woody goldenrod	<i>Chrysoma pauciflosculosa</i>
		<b>Maritime Hammock</b>	
Seashore paspalum	<i>Paspalum distichum</i>	Live oaks	<i>Quercus virginiana</i>
Beach cordgrass	<i>Spartina patens</i>	Cabbage palms	<i>Sabal palmetto</i>
Beach morning glory	<i>Ipomoea stolonifera</i>	Magnolia	<i>Magnolia grandiflora</i>
Bitter panicum	<i>Panicum amarum</i>	Scrub oak	<i>Quercus geminata</i>
		Yaupon holly	<i>Ilex vomitoria</i>
		Saw palmetto	<i>Serenoa repens</i>
<b>Coastal Interdunal Swale</b>		<b>Mesic Flatwoods</b>	
Beach cordgrass	<i>Spartina patens</i>	Cabbage palms	<i>Sabal palmetto</i>
Saltbush	<i>Baccharis halimifolia</i>	Slash pine	<i>Pinus elliotti</i>
Sand pine	<i>Pinus clausa</i>	Willow	<i>Salix floridana</i>
Sand live oak	<i>Quercus geminata</i>	Sawgrass	<i>Clamadium jamaicense</i>
Lichen	<i>Cladonia leporina</i>	Vines	<i>Vitis munsoniana</i>
Perforate lichen	<i>Cladonia perforata</i>	Vines	<i>Mikania cordifolia</i>
White-topped sedge	<i>Dichromena colorata</i>	Shrub	<i>Myrica cerifera</i>
Ludwigia	<i>Ludwigia alata</i>	Yaupon holly	<i>Ilex vomitoria</i>
Nutrush	<i>Scleria verticillata</i>	Fetterbush	<i>Lyonia lucida</i>
Seashore paspalum	<i>Paspalum distichum</i>	Gallberry	<i>Ilex glabra</i>
Gulf cordgrass	<i>Spartina spartinae</i>	Wicky	<i>Kalmia hirsuta</i>
Marsh elder	<i>Iva frutescens</i>	Mint	<i>Conradina canescens</i>
Muhly grass	<i>Muhlenbergia capillaris</i>	Lichens	<i>C. leporina and C. perforata</i>

## Sensitive Species On and Near Eglin Beach Resources

Scientific Name	Common Name	Status	Location
<b>Reptiles</b>			
<i>Caretta caretta</i>	Loggerhead Sea Turtle	FT, ST	SRI
<i>Chelonia mydas</i>	Green Sea Turtle	FE, SE	SRI
<i>Dermochelys coriacea</i>	Leatherback Sea Turtle	FE, SE	SRI
<b>Birds</b>			
<i>Charadrius alexandrinus</i>	Snowy Plover	ST	SRI
<i>Charadrius melanotos</i>	Piping Plover	FT, ST	SRI
<i>Egretta caerulea</i>	Little Blue Heron	SSC	SRI
<i>Egretta thula</i>	Snowy Egret	SSC	SRI
<i>Egretta tricolor</i>	Tricolor Heron	SSC	SRI
<i>Eudocimus albus</i>	White Ibis	SSC	SRI
<i>Rynchops niger</i>	Black Skimmer	SSC	SRI
<i>Sterna antillarum</i>	Least Tern	ST	SRI
<b>Mammals</b>			
<i>Peromyscus polionotus leucocephalus</i>	Santa Rosa Beach Mouse	CT	SRI
<b>Plants</b>			
<i>Cladonia perforata</i>	Florida Perforate Lichen	FE, SE, CT	SRI

CT = Eglin conservation target; FE = Federally endangered; FT = Federally threatened; SE = State endangered; SRI = Santa Rosa Island; SSC = State species of special concern; ST = State threatened

## Sea Turtle Nesting on SRI, Eglin AFB

Parameter	Loggerhead	Green	Leatherback	Kemp's Ridley
Total number nests	382	117	3	Possibly one in 2004; eggs sent off for DNA testing
Years nesting documented	1989-2006	1990, 1992, 1994, 1996, 1997, 1998, 2000, 2002, 2003, 2005, 2006	2000	No data
Earliest documented nest	May 23	May 20	May 12	No data
Latest documented nest	Aug 26	Aug 22	June 19	No data
Average annual number of nests	21.22	10.63	Insufficient data	No data
Average annual number of nests per mile	1.24	.62	Insufficient data	No data
Peak nesting period (two peak months)	June and July	June and July	Insufficient data	No data
Percentage of nests laid during the two peak months	86%	83%	Insufficient data	No data
Peak hatching period (two peak months)	August and September	August and September	Insufficient data	No data
Average number eggs in a nest	113	136	Insufficient data	No data
Average annual nest emergence success rate	56%	55%	Insufficient data	No data
Incubation period (range)	52-89 days	51-82 days	Insufficient data	No data
Incubation period (average)	67 days	69 days	Insufficient data	No data
Estimated number of hatchlings produced annually <sup>1</sup>	2398	1446	Insufficient data	No data

1. Assumes 100 percent survival

***Endangered, Threatened, and Rare Flora and Fauna of the Proposed Project Site***

Eglin AFB protects numerous plant and animal species through habitat management, specifically through the management of habitats and species identified as conservation targets by The Nature Conservancy. The following table provides information regarding flora and fauna species that typically inhabit the ecological association of proposed project site (Test Area A-15).

**Endangered, Threatened, and Rare Flora and Fauna Associated With SRI, Eglin AFB**

Scientific Name	Common Name	Status
<b>FISHES</b>		
<i>Acipenser oxyrinchus desotoi</i>	Gulf Sturgeon	FT, SSC
<b>REPTILES</b>		
<i>Caretta caretta</i>	Loggerhead Sea Turtle	FT, ST
<i>Chelonia mydas</i>	Green Sea Turtle	FE, SE
<i>Dermochelys coriacea</i>	Leatherback Sea Turtle	FE, SE
<i>Lepidochelys kempii</i>	Kemp's Ridley Sea Turtle	FE, SE
<b>BIRDS</b>		
<i>Charadrius alexandrinus</i>	Snowy Plover	ST, C
<i>Charadrius melanotos</i>	Piping Plover	FT, ST
<i>Egretta caerulea</i>	Little Blue Heron	SSC
<i>Egretta thula</i>	Snowy Egret	SSC
<i>Egretta tricolor</i>	Tricolor Heron	SSC
<i>Eudocimus albus</i>	White Ibis	SSC
<i>Rynchops niger</i>	Black Skimmer	SSC
<i>Sterna antillarum</i>	Least Tern	ST
<b>MAMMALS</b>		
<i>Peromyscus polionotus leucocephalus</i>	Santa Rosa Beach Mouse	CT
<i>Trichechus manatus</i>	West Indian Manatee	FE, SE
<i>Tursiops truncatus</i>	Atlantic Bottlenose Dolphin	MMPA
<b>PLANTS</b>		
<i>Cladonia perforata</i>	Florida Perforate Lichen	FE, SE, CT
<i>Drosera intermedia</i>	Spoon-leaved Sundew	ST

FE = Federally endangered, FT = Federally threatened, C = Federal candidate, MMPA = Marine Mammal Protection Act, CT = Eglin/FNAI conservation target, SE = State endangered, ST = State threatened, SSC = State species of special concern.

***Soils Data for the Proposed Project Site***

The soils on Santa Rosa Island are mostly well drained, sandy soils belonging to the Beaches Association and Newhan-Corolla Association. Dorovan Muck, Duckston Sand, and Rutlege Sand exist in the depressional areas. After heavy rainfall, the ponds may become fresh for brief periods. Likewise no well-developed drainages exist, but numerous coves and inlets may be found along the northern edge of Santa Rosa Island. The physical and chemical properties of the soil types found on SRI are shown in table below.

**Physical and Chemical Data of Soils on Santa Rosa Island**

Soil Type	Soil Depth (approx. inches)	Texture	Slope (%)	pH	Organic Matter (%)	Clay (%)	Permeability (inches/hour)
Beaches	0 – 60	Sand, fine sand	0 – 5	---	<1	<1	>6
Newhan-Corolla	0 – 80	Sand, fine sand	0 – 5	3.6 – 7.8	<0.5	0 - 3	>20
Rutlege Sand	0 – 80	Dark gray sand	<1	3.6 – 5.5	3 – 9	2 - 10	6.0 - 20
Duckston Sand	0 – 50	Light brown sand	<1	3.6 – 8.4	.5 - 3	0 - 4	>20
Dorovan Muck	0 – 80	Grayish brown muck	<2	3.6 – 4.4	20 - 80	---	0.6 – 2.0

***Barrier Island Ecological Association (Santa Rosa Island)***

A classification system of ecological associations has been developed based on flora, fauna, and geophysical characteristics. Santa Rosa Island falls under the *Barrier Island* ecological association, and its entire terrestrial area is classified as *Coastal Upland Community*. Within this community are sand beaches, beach dunes, coastal grassland, coastal interdunal swales, mesic flatwoods, and scrub communities. The acreages of each community type are listed in the table below.

**Santa Rosa Island Coastal Upland Community Types**

Communities	Acreage
Beach dune	393
Coastal grassland	1,140
Coastal swale	1,217
Scrub-goldenrod	1,140
Scrub-rosemary	396
Scrub-oak	30
Scrub-sand pine	259
Maritime hammock	10
Mesic flatwoods	171
<b>Total Acreage</b>	<b>4,756</b>

# Eglin ALRT Legal Description

	<b>OKALOOSA COUNTY PROPERTY APPRAISER'S OFFICE</b> <b>PETE SMITH, CFA - COUNTY APPRAISER</b>		
Owner Name	Property Address	Parcel Number	
Building Value	0	<b>ALL OF SANTA ROSA ISLAND LESS PLATTED SANTA ROSA ISLAND S/D AND PARTS SOLD</b>  The legal description shown here may be condensed for assessment purposes. Exact description may be obtained from the recorded deed.	
Extra Feature Value		0	
Land Value		169,402,222	
Agricultural Value		0	
* Just (Market) Value		169,402,222	
Assessed Value		169,402,222	
Exemption Value		169,402,222	
Taxable Value	0	0	
* Just (Market) Value is established by the Property Appraiser for ad valorem tax purposes. It does not represent anticipated selling price			
BUILDING INFORMATION			
No buildings associated with this parcel.			
LAND INFORMATION			
Description	Frontage	Depth	Land Units
MILITARY (008100)	0	0	3347.870
ACRES			
SALES INFORMATION			
<small>The Okaloosa County Property Appraiser's Office makes every effort to produce the most accurate information possible. No warranties, expressed or implied, are provided for the data herein, its use or interpretation. Assessed values are from the last certified taxroll. All data is subject to change before the next certified taxroll. Website Update: August 15, 2007.</small>			



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## **APPENDIX B**

### **ESA SECTION 7 CONSULTATION WITH USFWS (BIOLOGICAL ASSESSMENT AND BIOLOGICAL OPINION)**



**APPENDIX B-1. INITIAL BIOLOGICAL ASSESSMENT AND  
BIOLOGICAL OPINION**

**FORMAL**

**U.S. FISH AND WILDLIFE SERVICE**

**Endangered Species Act  
Section Seven Consultation**

**for the**

**AIRBORNE LITTORAL  
RECONNAISSANCE TECHNOLOGIES  
(ALRT) PROJECT  
AT EGLIN AFB, FLORIDA**

**January 2004**



**PRINTED ON RECYCLED PAPER**

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**LIST OF ACRONYMS, ABBREVIATIONS, AND SYMBOLS**

<b>AAC/EMSN</b>	Environmental Management Directorate, Stewardship Division, Natural Resources Branch
<b>AFB</b>	Air Force Base
<b>ALDAI-W</b>	Airborne Laser Diode Array Illuminator - Wide
<b>ALRT</b>	Airborne Littoral Reconnaissance Technologies
<b>BA</b>	Biological Assessment
<b>cm</b>	Centimeters
<b>COTS</b>	Commercial Off The Shelf
<b>ESA</b>	Endangered Species Act
<b>FMRI</b>	Florida Marine Research Institute
<b>FWC</b>	Florida Fish and Wildlife Conservation Commission
<b>GPS</b>	Global Positioning System
<b>Hz</b>	Hertz
<b>INBS</b>	Index Nesting Beach Survey
<b>nm</b>	Nanometers
<b>NMFS</b>	National Marine Fisheries Service
<b>NOAA</b>	National Oceanic and Atmospheric Administration
<b>NOHD</b>	Nominal Ocular Hazard Distance
<b>SAIC</b>	Science Applications International Corporation
<b>SRI</b>	Santa Rosa Island
<b>T&amp;E</b>	Threatened and Endangered
<b>u</b>	Attenuation Coefficient
<b>us</b>	Microsecond
<b>U.S.</b>	United States
<b>USFWS</b>	U.S. Fish and Wildlife Service

## **BIOLOGICAL ASSESSMENT TO DETERMINE IMPACTS TO FEDERALLY LISTED SPECIES RESULTING FROM THE AIRBORNE LITTORAL RECONNAISSANCE TECHNOLOGIES (ALRT) PROJECT AT EGLIN AIR FORCE BASE, FLORIDA**

### **1. INTRODUCTION**

This document is being submitted to fulfill requirements under Section 7 of the Endangered Species Act (ESA). Briefly, this report addresses potential impacts from the Airborne Littoral Reconnaissance Technologies (ALRT) project to federally listed threatened and endangered (T&E) species on Santa Rosa Island (SRI) at Eglin Air Force Base (AFB), Florida (Figure 1). This Biological Assessment (BA), conducted by Eglin's Environmental Management Directorate, Stewardship Division, Natural Resources Branch (AAC/EMSN), is meant to complete the formal consultation process with the U.S. Fish and Wildlife Service (USFWS) pursuant to Section 7 of the ESA. The objectives of this BA are to:

- Document all federally listed T&E species and associated habitat that occur, or may potentially occur, on the Eglin AFB Military Complex, to include SRI, Florida.
- Identify the ALRT activities that have the potential to impact, either beneficially or adversely, those documented species.
- Determine and quantify to the extent possible what effects these activities would likely have on federally listed species.

### **2. PROPOSED ACTION**

Naval forces require cost effective modular systems that can provide real time feedback of battlefield conditions of the littoral region at all required times of the day or night and without added risk to lives or expensive assets. The ALRT program is developing technologies to enhance current capabilities and provide solutions to current tactical reconnaissance problems. The ALRT project's primary objective is to design, develop, demonstrate, and provide new technologies to demonstrate enhanced Naval tactical remote reconnaissance of mines, minefields, obstacles, and other tactical military targets.

Continuing the development of ALRT, this series of tests would examine the capability of detecting minefields at night in the beach zone using a wide field of view diode laser illuminator array flown in a Cessna 172 aircraft or an MH-52 helicopter. The distinguishing feature of this test would be to obtain data over a set of more realistic amphibious landing zone environments (surf zone and beaches) to ascertain system performance and to aid in further minefield detection algorithm development when working in optical backgrounds of this type.

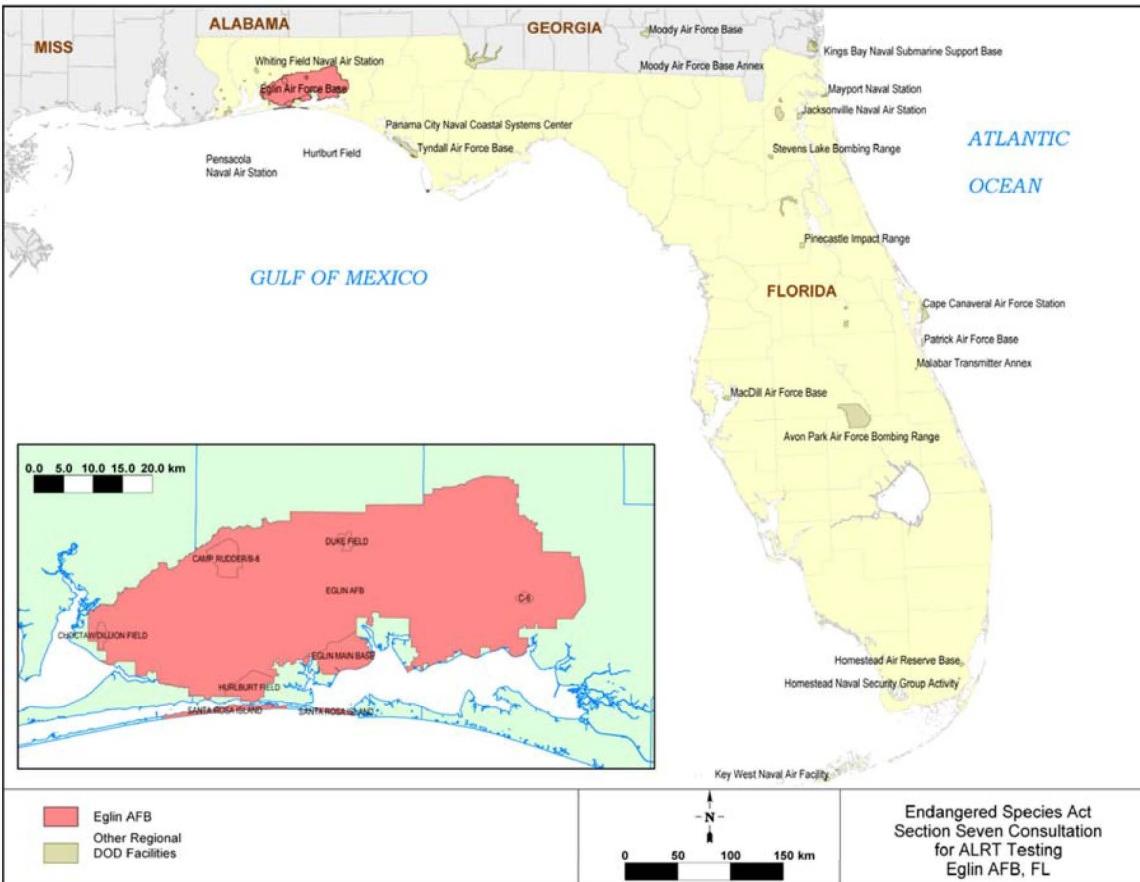


Figure 1. Location of Eglin AFB

### System Description

The system consists of the optical illumination and image recording hardware, navigation tracking software, mechanical cooling equipment for the illuminator, the Cessna 172 surrogate aircraft, and the MH-53 helicopter. The illuminator consists of six commercial-off-the-shelf (COTS), single wavelength, laser diode arrays. These low power lasers are enclosed in a light tight enclosure with a mechanical shutter for stopping illumination when not over target fields. In addition, there are a number of laser safety devices incorporated into the system to prevent inadvertent laser operation. Three cameras are used to record images of the target field. All recording is annotated electronically and the three channels are synchronized together with Global Positioning System (GPS) time.

The Airborne Laser Diode Array Illuminator - Wide (ALDAI-W) is a specially packaged Military Exempt laser light source that transmits a broad diverging beam at 808 nanometers (nm). It was developed to be an “at-wavelength flashlight” for nighttime broad-area illumination of background and targets from an airborne platform. Table 1 shows the laser specifications of the ALDAI-W, while Table 2 provides the hazard levels associated with the ALDAI-W laser.

**Table 1. ALDAI-W Laser Specifications**

ITEM	VALUE
Wavelength	808 nm
Power	0.47 Joules/Pulse
Pulse Width	200 us
Pulse Repetition Frequency	30 Hz
Beam Diameter in Horizontal Direction	3.0 cm (half power point)
Beam Diameter in Vertical Direction	4.5 cm (half power point)
Beam Divergence in Horizontal Direction	0.2985 radians (half power point)
Beam Divergence in Vertical Direction	0.1152 radians (half power point)
Gains of Aided Device	49 (Standard Binoculars)
Attenuation Coefficient (u)	$5.0 \times 10^{-7}$ 1/cm (Very Clear Day)

**Table 2. Laser Hazard Calculations for ALDAI-W**

ITEM	VALUE
Optical Density of Eyewear (unaided)	4.76 @ 808nm
Optical Density of Eyewear (aided)	6.46 @ 808nm
NOHD (unaided, u=0)	47.81 meters
NOHD (aided, u=0)	334.66 meters
HD (skin hazard)	0.08 meters

u = Attenuation coefficient

General precautions and procedures would be followed during system testing. As for laser radiation received on the ground, the ALDAI-W is eye-safe at approximately 150 feet, which is well above the ground for the planned minimum altitude of 500 feet. Thus, animals and unaided personnel on the ground would be safe from stray laser radiation. However, if any personnel were to view the ALDAI-W radiation with optical aids (such as binoculars), they would be well within the Nominal Ocular Hazard Distance (NOHD) of the ALDAI-W. To minimize the risk of

injury to stray ground personnel, the ALDAL-W would only actively radiate over the target fields (including a buffer zone of approximately 50 feet before and after the target fields) (Figure 2). Additionally, the test area would be controlled by ground and surface personnel that would clear the area before permission to actively fire the laser is granted (Figure 3). Personnel would have high-powered flashlights for proper safety control of the area. Also, Coast Guard boats would secure the area north (in Santa Rosa Sound) and south (Gulf of Mexico) to prevent boats from entering the buffer zone. Since the laser is eye safe at a distance, laser issues with the ALRT program are not covered in this document.

#### **Target Field and Target Deployment**

To approximate real-world environments, Eglin AFB's A-15 range provides an ideal background for obtaining imagery over sandy coastal terrain. In keeping with the program's requirement to detect minefields in the beach zone, the ALRT team would plan on utilizing three areas of A-15: the Gulf coast beach area, the bay side coastal area, and an intermediate area between the two coastal areas. Figure 4 shows the approximate target area of A-15.

Areas of A-15 to be flown over would be marked on the perimeter with four-foot square painted aluminum panels for reference. These panels would remain in place throughout the flight series. The first flight over A-15 would be with just the panels in place to obtain reference background imagery. The second flight would be flown with all targets in place. Targets include inert mines and obstacles (concrete blocks and concertina wire). They would be placed on A-15 over 3 or 4 days, the mission flights would commence, and they would be extracted from the test site over 2-3 days. The mines and obstacles would be on the beach for a period not to exceed two weeks.

Inert mines would be placed in each area in a fashion to simulate actual mine layouts in accordance with currently available doctrine. A combination of inert U.S. and foreign mines would be deployed as shown in Figure 5. M20 anti-tank mines and PDM-1M anti-tank/anti-landing craft mines would be used. These mine targets are representative of the different materials and types of anti-tank mines encountered in littoral scenarios and were readily available from the current project inventory. They would also provide a representative sampling of the sizes and spectral signatures likely to be encountered in real-world scenarios. Targets would be placed in "doublet rows" as shown with twenty M20s per row and twelve PDM-1Ms per row. All target and panel positions would be surveyed.

Targets at the water's edge (on both the Gulf and bay sides) would be anchored in place with sand anchors to prevent loss or significant movement of targets due to tidal and wave action. The first row in the surf zone would be approximately 2-3 feet deep during a mean high tide. All targets are clearly marked INERT and are tagged to indicate lot number and ownership of the target. The inert mines would be tethered together with a wire rope so no mines would be lost. The targets would not be permanently installed, but would be recovered at the completion of the tests.

Obstacles would be placed on the surface around the minefields (not in the water) (Figure 4). The concrete blocks would be placed between the road and the beach (in the dunes) by forklifts. Concertina (razor) wire would be placed along the beach and would stretch between 80 and 100 yards at approximately 3 to 4 feet wide. These targets would not be permanently installed but recovered at the completion of the test.

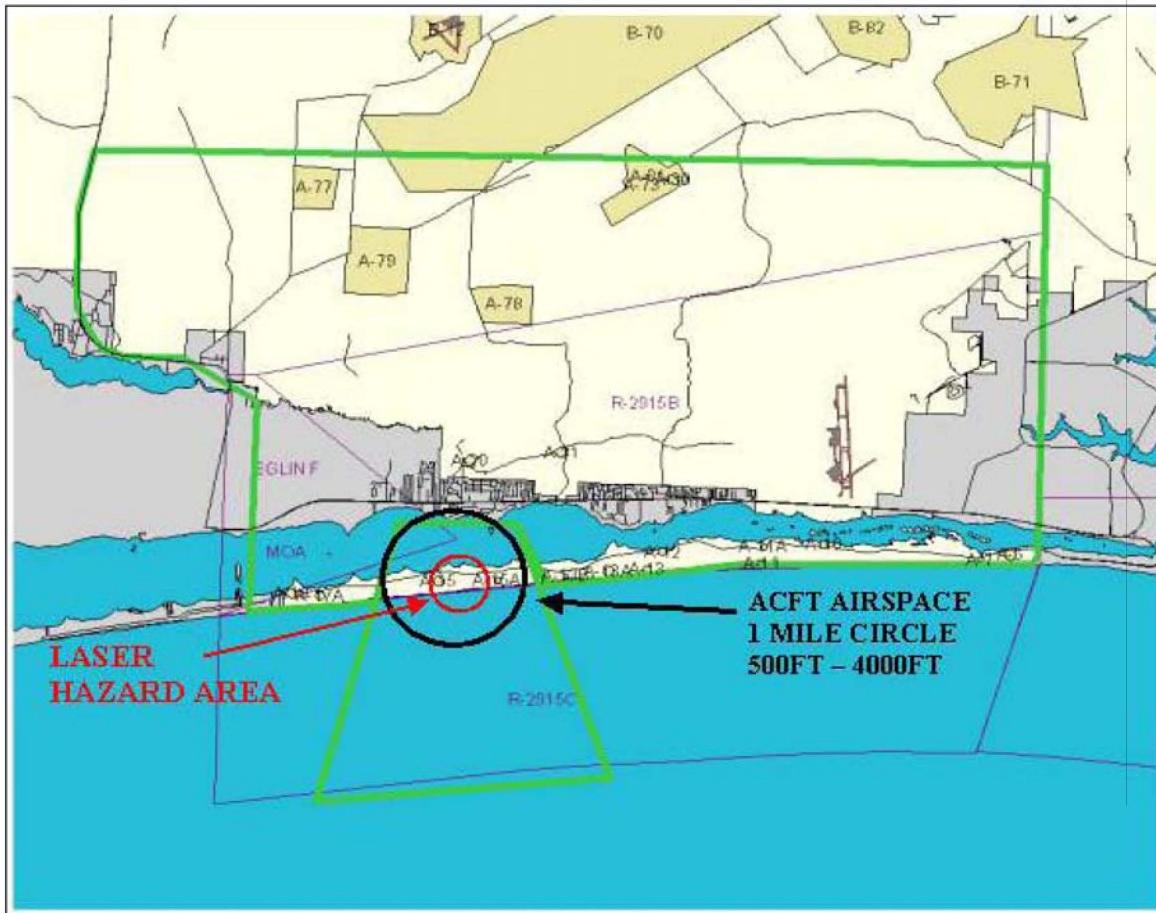


Figure 2. SRI Test Area A-15

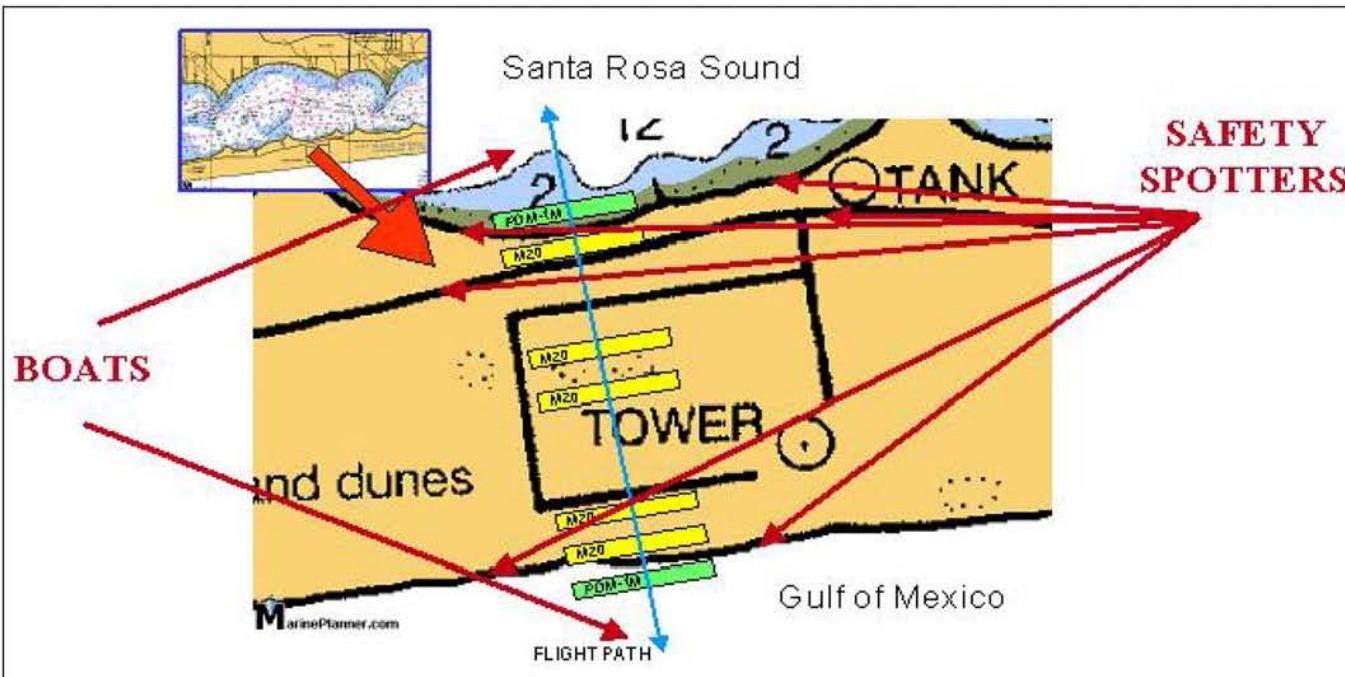


Figure 3. Ground Personnel Layout

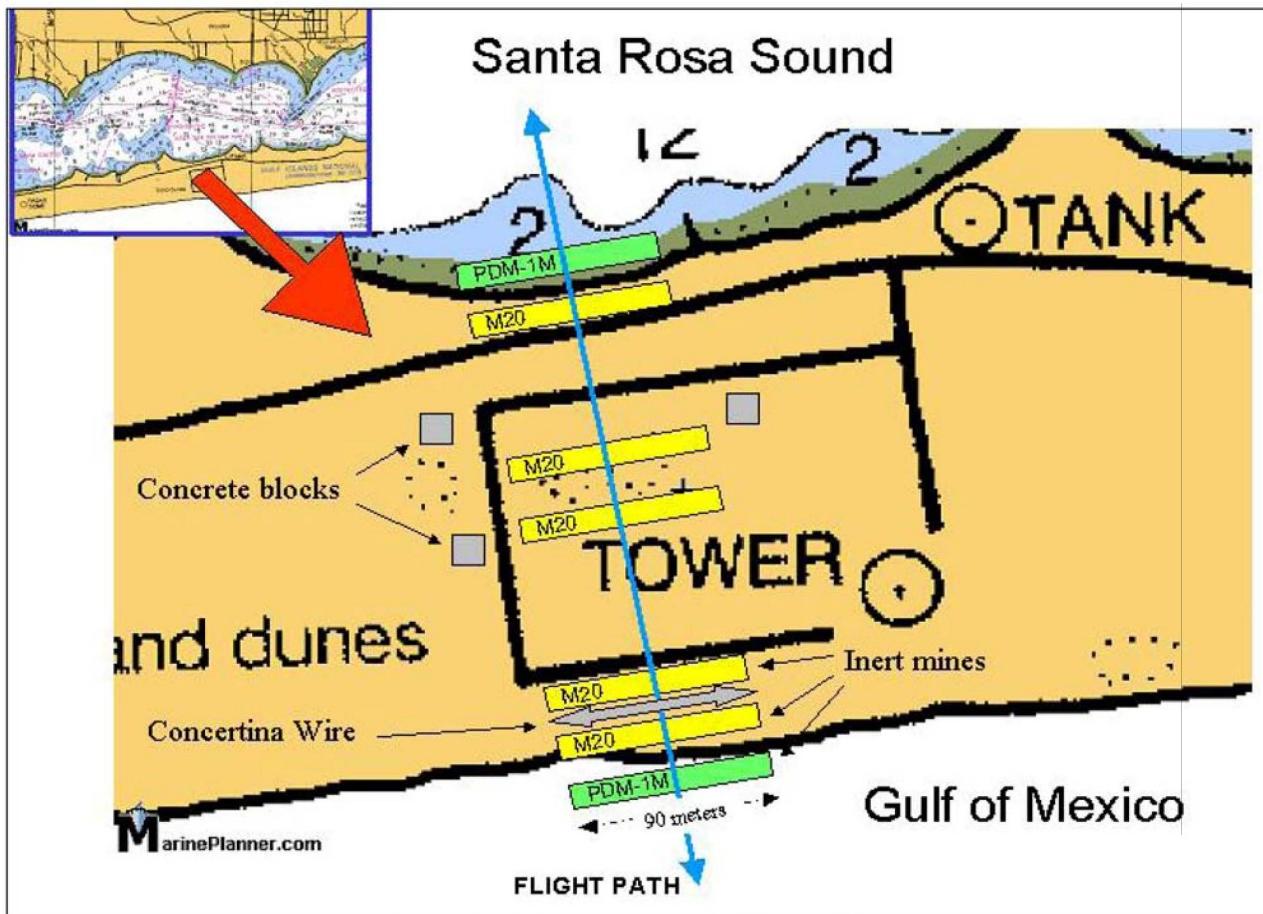
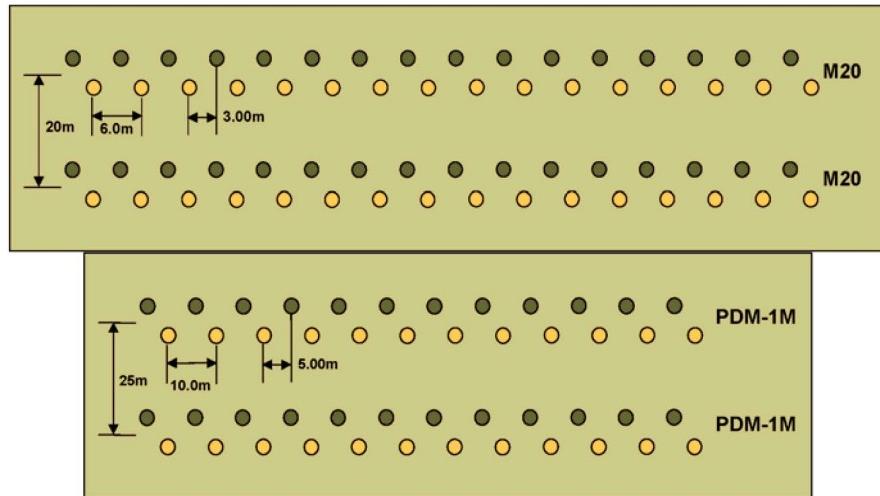


Figure 4. Eglin AFB A-15 Target Field Layout Diagram

7



**Figure 5. Inert Minefield Layout Diagram**

### 3. LOCATIONS AND SETTING DESCRIPTIONS

#### **Location**

Eglin AFB occupies 724 square miles of land area in the northwest Florida panhandle, east of Pensacola (Figure 1). This represents a major portion of the Florida panhandle's land area. Consequently, Eglin has a rich diversity of unique landscapes, habitats, and species that often fall under federal and state regulatory mandates.

The Eglin Military Complex includes Santa Rosa/Okaloosa Island (Figure 2). SRI, located in the southern section of Eglin AFB in Okaloosa County and Santa Rosa County, Florida, is a narrow barrier island approximately 50 miles long and less than 0.5 mile wide, separated from mainland northwest Florida by Santa Rosa Sound (a shallow lagoon varying in width from 400 to nearly 5,000 feet) and Choctawhatchee Bay. It is bordered on the south shore by the Gulf of Mexico and on the north shore by Santa Rosa Sound and Choctawhatchee Bay. Eglin controls 4,760 acres of SRI, a 4-mile strip eastward of Fort Walton Beach open for public recreation and a restricted access 13-mile section extending to the west to Navarre Beach, Florida. There are 2.5 miles of Okaloosa County property between the two parcels of Eglin property. Each of the three sections of island has unique characteristics (developed versus undeveloped land), and 15 Eglin AFB test sites are located on SRI (U.S. Air Force, 1997).

#### 4. SPECIES DESCRIPTIONS

Table 3 lists sensitive species that occur on and around Santa Rosa Island. Figure 6 delineates the location of known sensitive species occurring in the vicinity of Santa Rosa Island.

**Table 3. Endangered, Threatened, and Rare Flora and Fauna,  
Santa Rosa Island, Eglin Air Force Base, Florida**

SCIENTIFIC NAME	COMMON NAME	STATUS
<b>FISHES</b>		
<i>Acipenser oxyrinchus desotoi</i>	Gulf Sturgeon	FT, SSC
<b>REPTILES</b>		
<i>Caretta caretta</i>	Loggerhead Sea Turtle	FT, ST
<i>Chelonia mydas</i>	Green Sea Turtle	FE, SE
<i>Dermochelys coriacea</i>	Leatherback Sea Turtle	FE, SE
<b>BIRDS</b>		
<i>Charadrius alexandrinus</i>	Snowy Plover	ST, C
<i>Charadrius melanotos</i>	Piping Plover	FT, ST
<i>Egretta caerulea</i>	Little Blue Heron	SSC
<i>Egretta thula</i>	Snowy Egret	SSC
<i>Egretta tricolor</i>	Tricolor Heron	SSC
<i>Eudocimus albus</i>	White Ibis	SSC
<i>Rynchops niger</i>	Black Skimmer	SSC
<i>Sterna antillarum</i>	Least Tern	ST
<b>MAMMALS</b>		
<i>Peromyscus polionotus leucocephalus</i>	Santa Rosa Beach Mouse	CT
<i>Trichechus manatus</i>	West Indian Manatee	FE, SE
<i>Tursiops truncatus</i>	Atlantic Bottlenose Dolphin	MMPA
<b>PLANTS</b>		
<i>Cladonia perforata</i>	Florida Perforate Lichen	FE, SE, CT

FE = Federally endangered, FT = Federally threatened, C = federal candidate,  
MMPA = Marine Mammal Protection Act, CT = Eglin/FNAI conservation target,  
SE = State endangered, ST = State threatened, SSC = State species of special concern

##### **Gulf Sturgeon (*Acipenser oxyrinchus desotoi*)**

The Gulf sturgeon migrates from salt water into large coastal rivers to spawn and spend the warm months (Wordsworth Dictionary of Science and Technology, 1995). It lives predominately in the northeastern Gulf of Mexico, where it ranges from the Mississippi Delta east to the Suwannee River in Florida. However, it can also be found in the bays and estuaries throughout this range (U.S. Coast Guard, 1996). Spawning takes place during April through June in fresh water such as the Yellow River, which borders Eglin AFB along the northwest (Paruka, 1996). Little is known about the offshore distance the Gulf sturgeon travels, but analyses of stomach contents suggest that feeding occurs as far as 20 miles offshore (Page and Burr, 1991; U.S. Coast Guard, 1996). In the area of interest, all of Santa Rosa Sound and the Gulf of Mexico (from shore to 1 nautical mile offshore) are proposed as critical habitat.

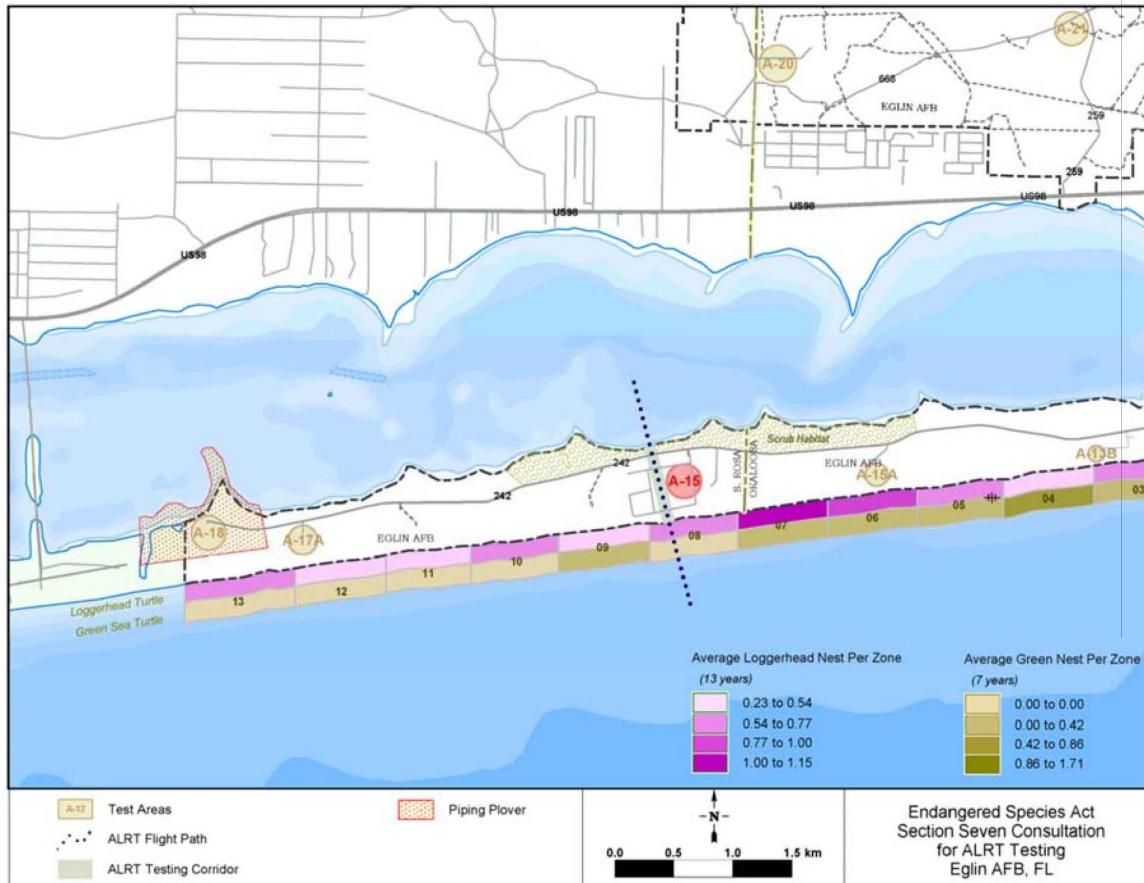


Figure 6. Sensitive Species Occurring in the Vicinity of Santa Rosa Island

**Gulf Sturgeon (*Acipenser oxyrinchus desotoi*) Critical Habitat**

Critical habitat for the Gulf sturgeon was designated in March 2003. Critical habitat is a term that refers to specific geographic areas that contain the essential habitat features necessary for the conservation of threatened and/or endangered species. Critical habitat areas may require special protection or management considerations for current populations as well as potential population increases necessary to achieve species recovery. Features include food, water, shelter, breeding areas, and space for growth, among other requirements. In the Final Rule for the designation of critical habitat for the Gulf sturgeon, seven primary constituent elements are identified:

- 1) Abundant food items within riverine habitats for larval and juvenile life stages, and within estuarine and marine habitats for adult and subadult life stages
- 2) Riverine spawning sites with suitable substrate
- 3) Riverine aggregation areas (resting, holding, or staging areas)
- 4) Proper stream flow regime for all life stages
- 5) Adequate water quality for all life stages
- 6) Adequate sediment quality for all life stages
- 7) Safe and unobstructed migratory pathways for passage within and between riverine, estuarine, and marine habitats

Critical habitat for the Gulf sturgeon is comprised of 14 geographic areas, or units. The units collectively encompass almost 2,800 river kilometers and over 6,000 square kilometers of estuarine and marine habitat. Critical habitat is delineated for all of the Yellow River, Santa Rosa Sound, and Choctawhatchee Bay, and extends from the mean high water line to 1 nautical mile offshore.

**Sea Turtles**

Of the five species of marine turtles found in the Gulf of Mexico, three species are known to nest on SRI beaches. These species are the Atlantic green turtle, Atlantic loggerhead turtle, and the leatherback turtle. However, the majority of nests on SRI are from loggerhead sea turtles. The U.S. Fish and Wildlife Service oversees sea turtle protection and conservation of habitat on land, while the National Oceanic and Atmospheric Administration (NOAA) Fisheries branch of the National Marine Fisheries Service (NMFS) oversees protection in marine waters. The officially recognized sea turtle nesting and hatching season in northwest Florida occurs from May 1 through November 30, with most hatching between mid-August and mid-October.

**Atlantic Loggerhead Sea Turtle (*Caretta caretta*)**

Loggerhead sea turtles nest within the continental United States from Louisiana to Virginia (National Marine Fisheries Service and U.S. Fish and Wildlife Service, 1991). Nesting females approach SRI in the spring and summer to dig their nests between the high tide mark and the dune line, and sometimes between dunes.

**Atlantic Green Sea Turtle (*Chelonia mydas*)**

The Atlantic green sea turtle (*Chelonia mydas*) has a breeding population in Florida and along the Pacific Coast of Mexico that is listed as endangered; all other populations are listed as threatened. Nesting activity has been documented along the Florida Gulf coasts (Meylan et al., 1995) as well. Green turtle nesting has been documented in all counties in northwest Florida but not on all beaches. The officially recognized nesting and hatching season for the green sea turtle extends from May 1 through November 30 in Florida's panhandle. Nesting in the panhandle, however, has been consistently documented as an every other year event since 1990 during the even years, with incubation periods ranging from 60 to 90 days. During the 2003 nesting season, three green sea turtles nested on Eglin AFB. Eglin AFB SRI property supports the highest number of green sea turtle nests in northwest Florida.

**Leatherback Sea Turtle (*Dermochelys coriacea*)**

This species commonly nests along the shorelines of the Atlantic, Pacific, and Indian Oceans. Only infrequent nesting activity has been documented for the leatherback in northwest Florida (LeBuff, 1976; FWC FMRI, unpubl. data; Longeliere et al., 1997). The officially recognized nesting and hatching season for the leatherback extends from March 1 through October 31, with nest incubation ranging from 60 to 75 days (FWC FMRI unpublished data; Longeliere et al., 1997; FWC FMRI, 1998). Until the spring of 2000, the only confirmed leatherback nestings in northwest Florida were in Franklin and Gulf counties. In May and June 2000, leatherback nesting activity was documented for the first time in Okaloosa County on Eglin's portion of SRI (Miller, personal communication, 2000).

**Piping Plover (*Charadrius melanotos*)**

This bird's primary winter range is along the Atlantic and Gulf coasts from North Carolina to Mexico and into the Bahamas and West Indies (USFWS, 1988, 1989 as cited in USFWS, 1996). Piping plovers are commonly documented during winter in the Florida panhandle, with the highest numbers of birds occurring in Franklin, Gulf, and Bay counties. Even though Florida has not been considered a primary wintering area for piping plover, diminishing habitat along other Gulf coast areas may be affording the piping plover new wintering grounds in Florida. These wintering grounds are still considered less suitable, thus forcing the piping plover to utilize isolated patches. As a result, critical habitat has been designated for piping plovers along the Gulf coast of Florida, a portion of which covers SRI (Figure 6).

**Piping Plover Critical Habitat**

Wintering critical habitat for the piping plover was designated on July 10, 2001 (66 *Federal Register* 36038). *Critical habitat* is a term that refers to specific geographic areas that contain the essential habitat features necessary for the conservation of threatened and/or endangered species. These essential habitat features are found in coastal areas that support intertidal beaches and flats (between annual low tide and annual high tide) and associated dune systems and flats above annual high tide. At the time of designation, the critical habitat areas do not necessarily have to be occupied by piping plovers. Critical habitat areas may require special protection or management considerations for current populations as well as potential population increases necessary to achieve species recovery.

The USFWS has identified several activities that may potentially have adverse impacts on piping plover critical habitat. Such activities may include dredging and dredge spoil placement; seismic exploration; construction and installation of facilities, pipelines, and roads associated with oil and gas development, oil spills, and oil spill cleanup; construction of dwellings, roads, marinas, and other structures; staging of equipment and materials; beach nourishment, stabilizations, and cleaning; all-terrain vehicular activity; storm water and wastewater discharge; sale, exchange, or lease of federal land that contains suitable habitat that is likely to result in the habitat being degraded; marsh restoration; and military maneuvers.

#### **Florida Perforate Lichen (*Cladonia perforata*)**

This pale, yellowish-gray lichen forms large dense clusters, the branches of which arise from spore-producing structures and not from the vegetative body of the fungus as is the case with other branched lichens. This species was listed as endangered in the *Federal Register*, April 27, 1993. There are a total of 27 confirmed sites in Florida where this lichen can be found, two of which are on SRI. This fragile species is vulnerable to trampling from foot traffic and habitat destruction during land development and high-intensity storm events.

### **5. EFFECTS OF PROPOSED ACTION IMPLEMENTATION**

The activities described under the proposed action have the potential to impact federally listed species associated with SRI within the Eglin Military Complex. Effects analysis in this BA focus on the elements associated with the training activity and its potential impacts on species. The narrative of potential impacts associated with ALRT elements and activities is divided amongst each species.

#### **Gulf Sturgeon (*Acipenser oxyrinchus desotoi*)**

ALRT testing includes placing inert mines tied together by a wire rope in 2 to 3 feet of water in the Santa Rosa Sound and Gulf of Mexico. ALRT mines would be placed on the surface of the sediments and sand. No seagrasses are located in the test area. The area affected would be above the mean low tide 3-foot bathymetry line (maximum depth of bottom disturbance) to the shoreline, and minimal turbidity would result from mine placement. Due to the area affected (3-foot depth to shore) existing outside of their primary habitat (6.5 to 13 feet) and small impact area, impacts to the Gulf sturgeon through habitat alteration are not anticipated.

**As a result, activities associated with ALRT testing are anticipated to have NO EFFECT on Gulf sturgeon individuals or populations.**

#### **Gulf Sturgeon Critical Habitat**

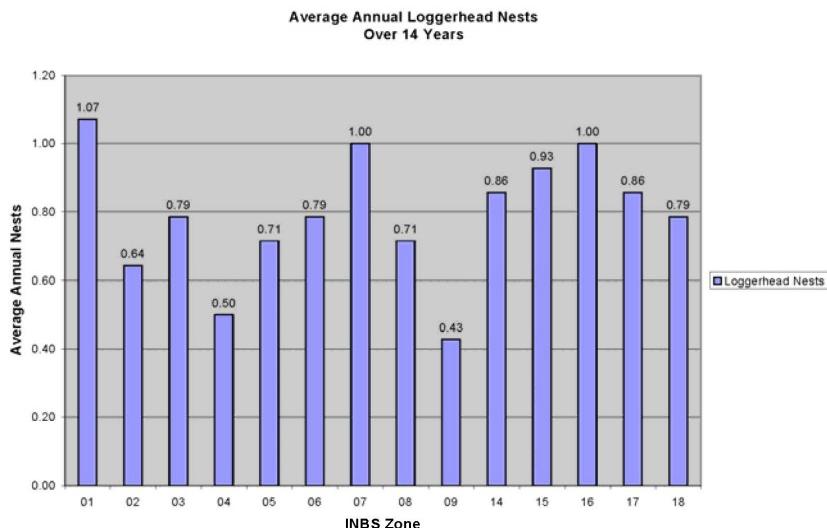
ALRT testing may affect sandy, muddy substrate. No seagrasses are located in the test area. The area affected would be above the mean low tide 3-foot bathymetry line (maximum depth of bottom disturbance) to the shoreline and minimal turbidity would result from mine placement. Erosion and turbidity from mine placement are neither widespread nor significant enough to affect the Gulf sturgeon critical habitat.

**As a result, activities associated with ALRT testing are not likely to adversely modify Gulf sturgeon critical habitat.**

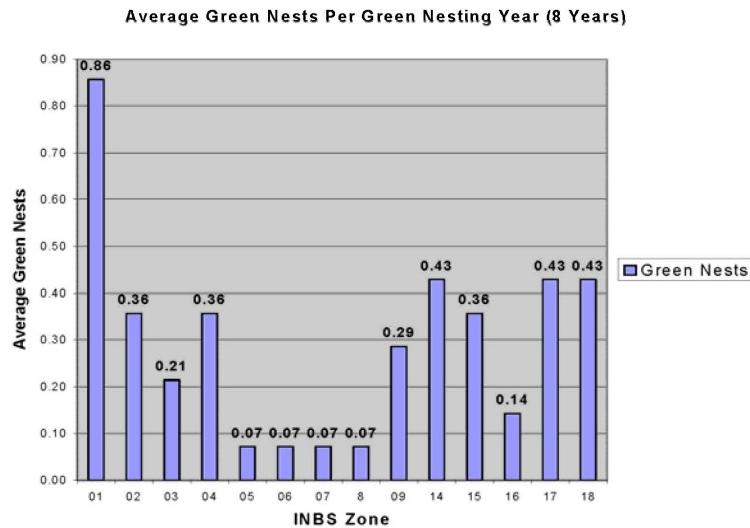
#### **Sea Turtles**

As a part of the Florida Fish and Wildlife Conservation Commission's statewide Index Nesting Beach Survey (INBS), the restricted portion of the SRI beachfront has been divided into half-mile survey zones, and nesting data are recorded according to the zone in which they occur. The average annual nest occurrence within each zone is displayed in Figures 7 and 8 below. These averages were calculated over 14 years for the Atlantic loggerhead and over 8 years for Atlantic green turtles due to the fact that green turtles nest only every other year on SRI. ALRT testing will occur within zones 8 and 9.

The sea turtle reproduction cycle can be divided into four time periods. During the first time period, only nesting occurs within the test area. During the second time period, hatchlings emerge from previously laid nests while adult sea turtles continue to come ashore to lay new nests. During the third time period, adults have ceased to come ashore for nesting, while hatchlings continue emerging from existing nests. During the fourth time period, neither nesting nor hatching behavior is expected to occur in the test area.



**Figure 7. Average Loggerhead Nesting Data by INBS Zone (1989–2003)**

**Figure 8. Average Green Turtle Nesting Data by INBS Zone (Biannually 1990–2003)**

An analysis of INBS emergence data for SRI revealed that 85 percent hatched between 60 and 80 days of incubation. The shortest recorded incubation length for a loggerhead nest is 52 days and the longest is 89 days. Out of 54 green turtle nests, 45 (or 83 percent) hatched between 60 and 80 days of incubation. The shortest recorded incubation length for a green turtle nest is 51 days and the longest is 82 days. The two recorded incubation lengths for leatherback nests were 85 and 94 days (U.S. Air Force, 2003). Based on this information, four time periods were calculated for each species. The earliest and latest possible dates for all species were selected to produce the combined species time periods (Table 4).

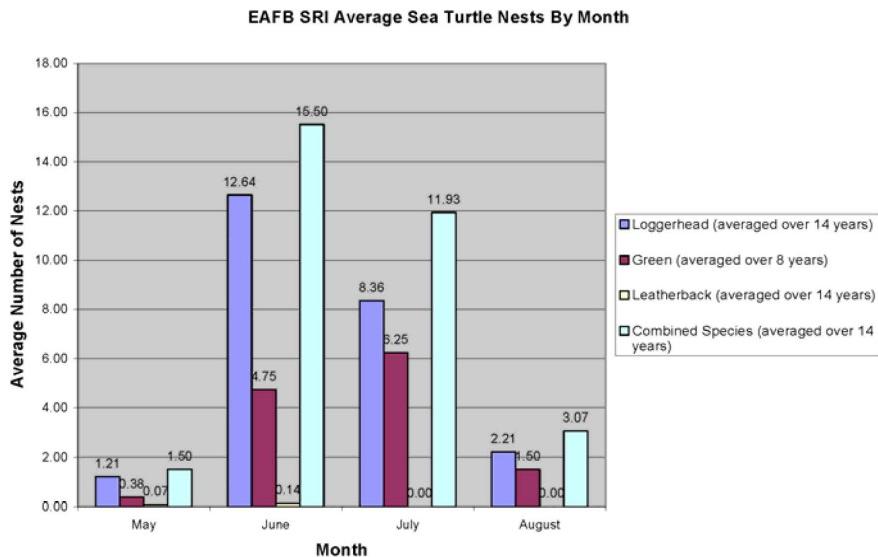
**Table 4. Sea Turtle Nesting Periods by Species**

Species	Nesting Only	Nesting and Hatching	Hatching Only	Off-Season
<i>Caretta caretta</i>	May 19 – Jul 9	Jul 10 – Aug 22	Aug 23 – Nov 19	Nov 20 – May 18
<i>Chelonia mydas</i>	May 20 – Jul 9	Jul 10 – Aug 22	Aug 23 – Nov 12	Nov 13 – May 19
<i>Dermochelys coriacea</i>	May 12 – Jun 19	N/A	Aug 5 – Sep 21	Sep 22 – May 11
<b>Combined Species</b>	<b>May 12 – Jul 9</b>	<b>Jul 10 – Aug 22</b>	<b>Aug 23 – Nov 19</b>	<b>Nov 20 – May 11</b>

Based on the data presented in Table 4, ALRT testing taking place on SRI between November 20 and May 11 effectively has a zero percent probability of directly impacting sea turtle nesting and hatching activities.

Figure 9 shows the average number of nests that have occurred on Eglin SRI by month. Again, the total number of green turtle nests was averaged over 8 years, while that for loggerheads and leatherbacks was averaged over 14 years. This information indicates that the peak nesting period

for loggerhead sea turtles occurs in June, earlier than the peak green turtle nesting period, which occurs in July.



**Figure 9. Eglin AFB SRI Average Sea Turtle Nest Occurrences by Month (1989-2003)**

Because historical hatchling emergence data for Eglin AFB, SRI, are incomplete, an expected average emergence by month was calculated for each species based on the available emergence data. For example, hatchling emergence dates have been recorded for 174 of 328 total loggerhead nests. Of the 174 recorded hatching dates, only 4 (2.3 percent) occurred in July. If this percentage is applied to the total number of loggerhead nests recorded, we would expect 7.54 loggerhead nests to have occurred in July over the 14-year data collection period, yielding an average of 0.58 loggerhead nests annually during the month of July. This information is summarized in Table 5. This table provides an estimated number of hatching events expected in each given month. Emergence dates are not available for a randomly selected sample of nests for each species, and therefore these averages may be slightly skewed. However, because emergence dates were available for 233 out of the 432 total nests, the calculated averages should suffice for purposes of this analysis.

**Table 5. Eglin AFB SRI Calculated Average Sea Turtle Hatching Occurrences by Month**

	Species	Loggerhead	Green	Leatherback	Combined
	Total nest	328	101	3	432
	No. nests w/ recorded hatching dates	174	57	2	233
July	Calculated average	0.58	1.01	0.00	1.14
August	Calculated average	13.05	4.05	0.00	17.10
September	Calculated average	9.14	6.83	0.03	16.00
October	Calculated average	2.32	2.53	0.00	4.85
November	Calculated average	0.15	0.00	0.00	0.15

The effects on sea turtle reproduction and appropriate avoidance and minimization measures for ALRT testing on SRI have been divided into five categories: deterrence, direct impact, obstruction, disorientation, and survey interference. These five categories, as described below, are the basis for impact analysis for the ALRT testing activities.

**Deterrence:** Nesting females may be deterred from entering the beach during nighttime testing because of high-powered flashlights and presence of people. Actively nesting females may be deterred from completing the egg laying process for this same reason. Bright lighting around nesting beaches also adversely affects the nesting process of adult green turtles, as the turtles will avoid areas subject to bright light.

**Direct impact:** ALRT activities along the beachfront may cause direct physical impact to hatchlings and/or nests in the landing area either by directly striking animals by walking on them during night surveys or driving on them during set up and take down of testing equipment.

**Obstruction:** Mines and obstacles staged on the beachfront may impede the nesting activities of females coming ashore and may obstruct the movement of hatchlings to the water.

**Disorientation/Misorientation:** The principal component of the sea-finding behavior of emergent hatchlings is their visual response to light. For this reason, bright lights used by safety spotters may result in the disorientation (loss of bearing) or misorientation (incorrect bearing) of the hatchlings. As a result, the exposure of the hatchlings to predation and desiccation is substantially increased.

**Survey Interference:** Survey interference involves the obscurrence or obliteration of evidence of sea turtle nests from the safety spotters. This would adversely affect the ability to identify, index, and monitor nests, as well as impede the ability to carry out avoidance and minimization procedures such as nest relocation actions that would help to minimize potential impacts from military mission activities.

#### **Set Up and Take Down of Equipment**

Set up and take down of equipment would only occur during the day. Cranes and trucks may enter the dune and beach area from the road to disperse the mines and obstructions for the ALRT tests. They would be used only during daylight hours and would therefore not be expected to pose a direct threat to adult sea turtles or hatchlings. The set up may take up to 3-4 days and the take down would take approximately 2-3 days.

There is a possible risk of indirect impact to nesting females, hatchlings, and nests during sea turtle season on the beachfront. Heavy vehicle movement and set up of equipment may obscure evidence of sea turtle crawls and nests. To prevent this, the test area would be surveyed for evidence of sea turtle activity prior to daytime set up and take down. Setup would not begin until the sea turtle survey is completed. The setup and take down equipment will not be left on the beach.

There is small risk of direct physical impact to nests in the test area. Personnel would be instructed to remain within the designated test area and avoid dunes over 5 feet high, thereby reducing impacts to nesting habitat. If a nest were found prior to setup, the test would be relocated east or west by a distance of at least 50 feet. All nests would be well marked and avoided. Vehicle ruts may impede the movement of hatchlings; however, ruts would be removed before dark during nesting season.

**With proper avoidance and minimization measures in place (see below), the set up and take down of mines and obstructions during nesting/hatching season is NOT LIKELY TO ADVERSELY AFFECT sea turtle reproduction on SRI.**

***Setup and Take Down Avoidance and Minimization Measures***

- All activity associated with set up and take down of ALRT testing would occur during daytime hours and after the morning sea turtle survey had been completed (during sea turtle season).
- All known sea turtle nests would be marked and protected in accordance with established Eglin Natural Resources Branch protocol.
- All ruts deeper than 2 inches created during daytime operations would be removed before sunset.
- All equipment used for setup and take down will be removed from the test area after set up and not left on the beach overnight.

**Mines and Obstructions**

Mines and obstructions would be placed across SRI that would cover a maximum of 100 yards in an east/west direction (Figures 3 through 5). These obstructions may discourage female sea turtles from nesting on the beachfront during nesting season. The affected area would be relatively small. The size of an inert mine is approximately 1 foot x 1 foot and would be placed directly on the ground. The concertina wire is approximately 4 feet wide and would stretch 80 to 100 yards, giving an estimated total footprint for the wire of 1,200 square feet (300 feet wide by 4 feet long). Calculations of peak nesting rates (see discussion above) show that the estimated number of nests deterred in a half-mile area around the test area over the entire nesting season would be 0.71 loggerhead turtle nests (Figure 7) and 0.07 green turtle nests (Figure 8). In reality, the area of deterrence created by ALRT mines and obstructions would be much less than a half-mile, reducing the rate of deterrence even further.

During hatching season, all sea turtle nests would be marked and protected in accordance with established Eglin Natural Resources Branch protocol. In the rare event that a sea turtle nest was

identified inside the proposed test area, the nests would be relocated at a distance of at least 50 feet from the test area. This would alleviate possible impacts to hatchlings attempting to enter the water. Natural Resource biologists would install a series of stakes and highly visible survey ribbon to establish a radius surrounding the nest. No activity would occur within this area.

**The proposed ALRT obstructions on SRI are LIKELY TO ADVERSELY AFFECT sea turtles during nesting season from May 1 to August 22. With proper avoidance and minimization measures in place (see below), ALRT obstructions on SRI are NOT LIKELY TO ADVERSELY AFFECT sea turtles during hatching season from August 22 to November 30.**

#### *Mines and Obstructions Avoidance and Minimization Measures*

Avoidance and minimization procedures that would be employed to minimize impacts to sea turtles from mines and obstructions associated with ALRT testing that were placed on the beach include:

- The project area would be placed at a distance of at least 50 feet from any existing nests, as identified through sea turtle nesting survey data.
- The project area would be evaluated for the potential presence of any undocumented turtle nests.
- The project area would be evaluated on a regular basis through the month of October to ensure no nesting activity occurred within or near the project area.
- If a nest is within one-half mile from the test area, a series of stakes and highly visible survey ribbon or string would be installed to establish a radius surrounding the nest. No activity would occur within this area, nor would any activity occur that could result in impacts to the nest. Nest sites would be inspected daily to be sure nest markers remain in place and that the nest has not been disturbed.
- If the nest had not hatched before the project was completed, the site would be inspected to ensure restoration activities after the test did not disturb the site or present difficulties for impending hatchlings.
- All personnel involved in set up or performing the test should familiarize themselves with all requirements. They should pay particular attention to the management actions.
- Spotters will remain clear of any nest and any potential turtle attempting to nest.

#### **Safety Surveys**

Due to the laser safety issues, safety spotters would be placed on the outer edges of the test area to inform personnel not to use binoculars during ALRT testing and to survey the area for unauthorized people on SRI. Safety spotters would be on the beach, sound, and road with high-powered flashlights during the flyovers (Figure 3).

The principal component of the sea-finding behavior of emergent hatchlings is their visual response to light. For this reason, bright lighting along beachfronts often results in the

disorientation (loss of bearing) or misorientation (incorrect bearing) of the hatchlings. As a result, the exposure of the hatchlings to predation and desiccation is substantially increased.

Lights from safety spotters operating within one-half mile of a hatching nest may pose a disorientation threat. To prevent this, the test area would be surveyed by the safety spotters for evidence of sea turtle activity immediately prior to night activities. Bright lighting around nesting beaches also adversely affects the nesting process of adult sea turtles, as they will avoid areas subject to bright light. There is not a risk of direct physical impact to nests, adults, and hatchlings because the spotters would be equipped with lights to avoid any well-marked nests and any hatchlings. All lighting on the beach would be reduced to the extent practicable; however, due to safety concerns, some lights would be required. Safety spotters would be used only during ALRT flyovers. Each flyover would last 2-4 hours at a time.

**The proposed ALRT safety surveys on SRI are LIKELY TO ADVERSELY AFFECT sea turtles from May 1 to November 30. ALRT surveys are anticipated to have NO EFFECT on sea turtles from December 1 to April 30. Proper avoidance and minimization measures (below) should decrease the chance for possible impacts.**

Avoidance and minimization procedures that would be employed to minimize impacts to sea turtles from ALRT safety surveys include:

- The project area would be placed at a distance of at least 50 feet from any existing nests, as identified through sea turtle nesting survey data.
- The project area would be evaluated for the potential presence of any undocumented turtle nests.
- The project area would be evaluated on a regular basis through the month of October to ensure no nesting activity occurred within or near the project area.
- If a nest is within one-half mile of the test area, a series of stakes and highly visible survey ribbon or string would be installed to establish a radius surrounding the nest. No activity would occur within this area, nor would any activity occur that could result in impacts to the nest. Nest sites would be inspected daily to be sure nest markers remain in place and that the nest had not been disturbed.
- All personnel involved in set up or performing the test should familiarize themselves with all requirements. They should pay particular attention to the management actions.
- If an adult sea turtle is observed on the beach during ALRT safety survey, personnel must remain quiet and keep moving, allowing the turtle to continue her activities. All effort must be made not to obscure the turtle crawl or nest area. The morning nesting survey will be responsible for marking and /or relocating the nest during the following morning survey.

#### **Piping Plover (*Charadrius melanotos*)**

Piping plovers can be expected to leave northern breeding grounds and arrive in wintering habitat as early as mid-July and return north again to breed in March (USFWS, 2001). Eglin AFB Natural Resources Branch and volunteer personnel have periodically conducted shorebird surveys on SRI during the wintering season. These surveys included participation in the

International Piping Plover Census in January of 1991, 1996, and 2001. Piping plovers were not sighted on Eglin's property during any of these official surveys. During the 2001 survey, the closest sighting occurred at Navarre Beach State Park and Big Sabine Point (Ferland and Haig, 2001). Volunteers from the Choctawhatchee Audubon Society have conducted periodic shorebird surveys on SRI during which six piping plovers were documented foraging within the designated critical habitat. Two shorebird surveys were conducted during January and February of 2003, and no piping plovers were sighted on SRI (Fenimore, 2003). ). Four piping plover surveys were conducted in December 2003 and no birds were sighted.

Although only a small section of SRI has been designated as critical habitat (see *Critical Habitat* discussion below), piping plovers may be found any place that affords proper foraging and sheltering resources. Piping plovers are known to forage in exposed wet sand areas such as wash zones, intertidal ocean beachfronts, wrack lines, washover passes, mud and sand flats, ephemeral ponds, and salt marshes. They are also known to use adjacent areas for sheltering in dunes, debris, and sparse vegetation. All of these habitat types can be found on Eglin's portion of SRI. Although it is possible that piping plovers could use any one of these habitat types at any time during the wintering season, studies have shown that wintering plovers spend 76 percent of their time foraging for invertebrates found just below the surface of wet sand (Johnson and Baldassarre, 1988). Therefore, during the wintering season, ALRT tests are more likely to encounter piping plovers in shoreline areas as opposed to inland movement corridors.

Piping plovers have only been documented using critical habitat areas on the north shore of SRI. However, research indicates that patterns of piping plover habitat usage can be very complex. Plovers could feasibly use several locations on the island for foraging, roosting, or sheltering at any time, day or night. Therefore, if the proposed action takes place during the piping plover wintering season (mid-July through early-March), it is possible that piping plovers may be present in the action area.

In the unlikely event that a piping plover was found in or near the test area, noise associated with the placement of mines and obstructions could be expected to flush the bird from the landing area, possibly causing stress and extra caloric expenditure. Set up and take down of the test area would be less than one week. During this time, displaced plovers may simply move on to undisturbed foraging areas nearby.

All flights over the island would be no lower than an altitude of 500 feet. Due to the height of island overflights, no impact to piping plovers is expected from aviation operations over SRI. The laser associated with the ALRT testing would have no effect on the piping plover and is discussed in the Proposed Action section of this document.

As stated previously, the only documented sighting of a piping plover occurred on the north side of the island within designated critical habitat. This critical habitat area is less than three miles west of the test area (Figure 6). Therefore, mines and obstructions at either the north or south shore within the test corridor are not expected to pose a threat to critical habitat. However, due to the complexity of plover habitat usage patterns, the presence of piping plovers in the test area cannot be ruled out. It is possible, though highly unlikely, that the concertina wire test obstruction could cause direct physical impact to an individual plover if the bird attempted to land on the wire. It is more likely that test setup and take down would serve to flush the bird from the landing area, possibly causing stress and extra caloric expenditure. The disturbance

generated by testing operations would be sufficient to keep piping plovers from foraging in the landing area during the course of the operation. During this time, displaced plovers may simply move on to undisturbed foraging areas.

**Because the risk of direct physical impact is slight and indirect disturbance would be temporary and localized in nature, ALRT testing on SRI is NOT LIKELY TO ADVERSELY AFFECT the wintering piping plover population. ALRT testing that takes place outside the plover wintering period would have NO EFFECT on wintering piping plover populations.**

#### *Piping Plover Critical Habitat*

The preservation of critical habitat in wintering areas is important to the survival of piping plover populations. Quality winter foraging and roosting is necessary if adults are to survive, migrate back to breeding sites, and nest successfully (USFWS, 2001). The Navarre Beach piping plover critical habitat (USFWS Unit FL-3) consists of 118 acres in Escambia and Santa Rosa counties. Eglin Air Force Base and SRI Authority own the majority of the unit. Within property administered by Eglin, critical habitat is situated on the north shore of SRI approximately 3 miles west of Test Site A-15. Activities associated with ALRT testing would not occur in or near piping plover critical habitat.

**Because ALRT testing would not occur in or near designated critical habitat, the proposed activities are not likely to adversely modify designated piping plover critical habitat on SRI.**

#### **Florida Perforate Lichen (*Cladonia perforata*)**

There are two small reintroduction sites adjacent to A-11A on SRI approximately 1 mile to the east of the test site. There is another small introduction site located approximately 2 miles to the east of Test Area A-10. The ALRT testing would not occur in close proximity to the westernmost lichen reintroduction population.

**Because ALRT testing would not occur within or near lichen areas, these activities are expected to have NO EFFECT on Florida perforate lichen on SRI.**

## **6. CONCLUSION**

Potential impacts to sea turtles would be associated with ALRT mines and obstructions and safety survey activities on the beach during nesting and hatching season. Direct physical impact to adults, hatchlings, and/or nests is unlikely, as nests would be well marked and surveyors would be aware of the presence of any hatching turtles. Based on turtle nesting data for the last 14 years (Figure 7), less than 1 nest would occur within one-half mile of the action area on SRI during an average green and loggerhead turtle nesting year. Encountering a sea turtle or sea turtle nest during a test is unlikely because tests would begin and finish within two weeks. However, the Natural Resources Branch has determined that the proposed ALRT testing activities are likely to adversely affect sea turtles on Eglin AFB. Impacts may be greatly reduced provided avoidance and minimization procedures are followed.

The U.S. Fish and Wildlife Service will be notified immediately if any of the actions considered in this biological assessment are modified or if additional information on listed species becomes available, as a reinitiation of consultation may be required. If impacts to listed species occur beyond what has been considered in this assessment, all operations will cease and the Service will be notified. Any modifications or conditions resulting from consultation with the Service will be implemented prior to commencement of activities. The Natural Resources Branch believes this fulfills all requirements of the Endangered Species Act and no further action is necessary.

## 7. REVIEW OF LITERATURE AND OTHER INFORMATION

All pertinent literature was reviewed. The following summary indicates the primary references utilized during preparation of this assessment.

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**Eglin Air Force Base  
Airborne Littoral Reconnaissance Technologies  
Testing**

**Biological Opinion  
June 4, 2004**

**Prepared by:  
U.S. Fish and Wildlife Service  
1601 Balboa Avenue  
Panama City, FL**



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**Acronyms**

AAC/EMSN	Environmental Management Directorate, Stewardship Division, Natural Resources Branch
AFB	Air Force Base
ALDAI-W	Airborne Laser Diode Array Illuminator – Wide
ALRT	Airborne Littoral Reconnaissance Technologies
BA	Biological Assessment
BO	Biological Opinion
cm	centimeters
COTS	Commercial Off the Shelf
ESA	Endangered Species Act
FMRI	Florida Marine Research Institute
FWC	Florida Fish and Wildlife Conservation Commission
GPS	Global Positioning System
Hz	Hertz
INBS	Index Nesting Beach Survey Program
NRB	Natural Resources Branch
nm	nanometers
NOAA	National Oceanic and Atmospheric Administration-Fisheries
NOHD	Nominal Ocular Hazard Distance
OI	Okaloosa Island
RPM	Reasonable and Prudent Measures
S/L	Static Line
SAIC	Science Applications International Corporation
SRI	Santa Rosa Island
STSSN	Sea Turtle Stranding and Salvage Network
T&E	Threatened and Endangered
u	Attenuation Coefficient
us	Microsecond
U.S.	United States
USAF	United States Air Force
USFWS	U.S. Fish and Wildlife Service

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June 4, 2004

Mr. Stephen M. Seiber  
Chief, Natural Resources Branch  
AAC/EMSN  
501 DeLeon Street, Suite 101  
Eglin Air Force Base, FL 32542-5133

Re: FWS Log No. 4-P-04-225  
Date Started: February 3, 2004  
Project Title: Airborne Littoral Reconnaissance  
Technologies Testing, Eglin AFB  
Ecosystem: NE Gulf  
County: Okaloosa County, Florida

Dear Mr. Seiber:

Enclosed is the Fish and Wildlife Service's (Service) final Biological Opinion (BO) for the Airborne Littoral Reconnaissance Technologies Testing (ALRT) at Eglin Air Force Base (Eglin), Florida, and its effects on endangered and threatened nesting sea turtles. The Service concurs that the proposed action is not likely to adversely affect Gulf sturgeon, piping plover, or the Florida perforate lichen, and would not adversely modify designated critical habitat for the wintering plover or Gulf sturgeon based on Eglin's commitment to incorporate measures to avoid and minimize impacts to these species. This opinion is provided in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

This biological opinion is based on information provided in the January 2004 project Biological Assessment (BA), supplemental information supplied by Eglin or contained in our files, and discussions with Eglin Natural Resources Branch staff. A complete administrative record of this consultation is on file in the Service's Panama City, Florida Field Office.

**CONSULTATION HISTORY**

<u>February 2004</u>	Eglin NRB provides the Service with a formal request for section 7 consultation for the ALRT program. A supporting biological assessment (BA) was provided in the request.
<u>May 11, 2004</u>	Eglin NRB advises the Service by telephone that the project has been revised for this year.
<u>May 13, 2004</u>	Eglin NRB provides via e-mail project changes to the Service.
<u>May 13, 2004</u>	The Service provides a response to Eglin NRB via e-mail about the revised plans.
<u>May 17, 2004</u>	The Service submits a draft biological opinion to Eglin NRB.
<u>May 17, 2004</u>	Eglin NRB provides the Services with their comments on the draft biological opinion via e-mail and advises the Service by telephone the project plans have been revised.
<u>May 21, 2004</u>	The Service submits a draft revised biological opinion to Eglin NRB.
<u>May 24, 2004</u>	Eglin NRB provides the Services with their comments on the draft revised biological opinion via e-mail.
<u>June 3, 2004</u>	The Service transmits a letter to Eglin NRB acknowledging and concurring with request for formal consultation.
<u>June 3, 2004</u>	The Service receives approval from Eglin NRB via e-mail to finalize the biological opinion.

**BIOLOGICAL OPINION****DESCRIPTION OF THE PROPOSED ACTION**

The proposed action, Airborne Reconnaissance Littoral Testing (ALRT), is to design, develop, demonstrate, and provide new technologies to demonstrate enhanced Naval tactical remote reconnaissance of mines, minefields, obstacles, and other tactical military targets. Naval forces require cost effective modular systems that can provide real time feedback of battlefield conditions of the littoral region at all required times of the day or night. The ALRT program is developing technologies to enhance current capabilities and provide solutions to current tactical reconnaissance problems. The ALRT is expected to occur during any time of the year for any

number of days or weeks. The majority of the operations will be conducted during nighttime hours. However, daytime activities related to the program will also occur at the project site.

ALRT is a series of tests that examine the capability of detecting minefields at night in the beach zone using a wide field of view diode laser illuminator array flown in a Cessna 172 aircraft or an MH-52 helicopter. The distinguishing feature of this test would be to obtain data over a set of more realistic amphibious landing zone environments (surf zone and beaches), to ascertain system performance, and to aid in further minefield detection algorithm development when working in optical backgrounds of this type.

This consultation covers only the ALRT activities that have been determined to adversely affect nesting sea turtles on Santa Rosa Island. The training exercises will be located at Eglin Santa Rosa Island Test Site A-15, along approximately 300 feet of Gulf of Mexico beachfront, dunes, and in the surf zone. The surf zone will include an area approximately 300 feet in length and 175 feet in width (1.2 acres) and the beach/dune area will cover an area 300 feet in length and 150 feet in width (1.0 acres).

#### **Target Field and Target Deployment**

The area on Site A-15 that is to be flown over would be marked on the perimeter with 4-foot square painted aluminum panels for reference. These panels would remain in place throughout the project period. At the completion of the testing, the panels would be removed.

The targets on the dry beach would be placed to simulate actual mine layouts. The layout design would be an array of four parallel lines. Each line would contain 20 inert mines spaced 18 feet apart. The minimum distance between obstacles and mines between lines is 10 feet. At the completion of the testing, the targets would be removed.

Targets in the surf zone would be anchored in place with sand anchors to prevent loss or significant movement of targets due to tidal and wave action. Only mines (inert) would be used in the water. The targets would be approximately 2 to 3 feet deep during a mean high tide. The mines would be placed in an array of four parallel lines. Each line would contain 12 mines or obstacles spaced 30 feet apart. The minimum distance between obstacles and mines between lines would be 15 feet. At the completion of the testing, the targets would be removed.

Obstacles consisting of either concrete blocks or concertina (razor) wire will be placed to surround the mines. Concertina wire would be placed along the beach, in the dunes, or on the north side of the road, and would stretch between 80 and 100 yards at approximately 3 to 4 feet wide. Concertina wire may not be used for every testing event.

The concrete blocks would be placed on the surface of the sand around the minefield arrays in the dune areas or next to a paved road. They would be installed using a forklift. At the completion of the testing, the blocks would be removed.

**Target Illuminator**

The illuminator is a diode laser that transmits a broad diverging beam at 808 nanometers (nm). It was developed to be an “at-wavelength flashlight” for nighttime broad-area illumination of background and targets from an airborne platform. General precautions and procedures would be followed during system testing. As for laser radiation received on the ground, the laser illumination is eye-safe at approximately 150 feet, which is well above the ground for the planned altitude of 500 feet. Thus animals and unaided personnel on the ground would be safe from stray laser radiation. To reduce the potential risk of injury the laser illuminator would only actively radiate over the target fields (with a buffer zone of approximately 50 feet before and after the target).

**Project Avoidance and Minimization Measures**

Eglin has committed to implementing the following avoidance and minimization procedures for sea turtles from ALRT activities:

1. All activity associated with set up and take down of ALRT testing would occur during daytime hours and after the morning sea turtle survey is completed between May 1 and October 31.
2. All sea turtle nests within the 100-yard ALRT project area will be relocated to just outside the area on either the east and west sides (minimum distance away of 50 feet). All sea turtle nests in the vicinity of the project area would be marked and protected in accordance with established Eglin Natural Resources Branch protocol. No activity would be allowed within the protected area of the nest.
3. All sea turtle nests naturally deposited within ½ mile of the ALRT project area would be clearly marked and protected. No activity would be allowed within the protected area of the nest. Nests would be checked daily to assure markers remain in place and the nest is not disturbed.
4. During the events when concertina wire will be used, silt fence will be installed to decrease the risk of entrapping sea turtles. The fence will be installed to direct the turtles away from the test area to adjacent beaches with no obstacles.
5. All personnel involved in set up or performing the ALRT testing will be familiarized with the conservation measures.
6. All project spotters will not disturb any nesting turtle and any nest laid and not yet moved from the project site.
7. All ruts created by the ALRT activities that are 2 inches or deeper would be removed before the next sunset.

Action Area

The ALRT is to occur on lands managed by Eglin Air Force Base at Test Sites A-15 on Santa Rosa Island (SRI). Test Site is also designated as Zone 8 under the State of Florida sea turtle Index Nesting Beach Survey (INBS). The zones are  $\frac{1}{2}$  mile in length. The ALRT project is to occur only over 300 feet of the zone. However, for a worst case scenario the Action Area will cover the entire zone instead of only 300 feet (Figure 1).



Figure 1: Location of project Action Area: Santa Rosa Island sites of ALRT activities on Eglin Air Force Base.

Santa Rosa Island comprises the Barrier Island ecological association at Eglin. Santa Rosa Island, located in the southern section of Eglin in Okaloosa County and Santa Rosa County, Florida, is a narrow barrier island approximately 50 miles long and less than 0.5 mile wide. Santa Rosa Island is separated from northwest Florida mainland by Santa Rosa Sound, a shallow lagoon varying in width from 400 to nearly 5,000 feet. Santa Rosa Island is bordered on the south by the Gulf of Mexico and on the north by Santa Rosa Sound, and on the east by Destin Pass/Choctawhatchee Bay. Eglin controls 17 miles (4,760 acres) of SRI, a 4-mile strip open for public recreation and a restricted access 13-mile section. There are 2.5 miles of Okaloosa County property between the two parcels of Eglin property. There are 15 test sites located on SRI. The beach dune and coastal strand communities are the most predominate vegetative communities present in each of these units.

**STATUS OF THE SPECIES/CRITICAL HABITAT**

The Service has responsibility for implementing recovery of sea turtles when they come ashore to nest. The National Oceanic and Atmospheric Administration-Fisheries (NOAA-Fisheries) has jurisdiction over sea turtles in the marine environment. This biological opinion addresses nesting sea turtles, eggs, and hatchlings only.

Four species of sea turtles are analyzed in this biological opinion: the threatened loggerhead sea turtle (*Caretta caretta*), the endangered green sea turtle (*Chelonia mydas*), the endangered leatherback sea turtle (*Dermochelys coriacea*), and the endangered Kemp's ridley sea turtle (*Lepidochelys kempii*).

**Species/critical habitat description****Loggerhead Sea Turtle**

The loggerhead sea turtle (*Caretta caretta*) was federally listed as a threatened species throughout its range in the United States (U.S.) on July 28, 1978 (43 FR 32800). No critical habitat has been designated for the loggerhead sea turtle.

The loggerhead sea turtle is characterized by a large head with blunt jaws and grows to an average weight of about 200 pounds. The loggerhead feeds on mollusks, crustaceans, fish, and other marine animals.

The loggerhead sea turtle inhabits the continental shelves and estuarine environments along the margins in the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans. Major nesting beaches are located in the Sultanate of Oman, southeastern U.S., and eastern Australia. The species is widely distributed within its range. It may be found hundreds of miles out to sea, as well as in inshore areas such as bays, lagoons, salt marshes, creeks, ship channels, and the mouths of large rivers. Coral reefs, rocky places, and ship wrecks are often used as feeding areas. Nesting occurs mainly on open beaches or along narrow bays having suitable sand, and often in association with other species of sea turtles.

**Recovery Criteria for the United States**

The southeastern U.S. population of the loggerhead can be considered for delisting if, over a period of 25 years, the following conditions are met:

1. The adult female population in Florida is increasing and in North Carolina, South Carolina, and Georgia, it has returned to pre-listing levels (NC - 800, SC - 10,000, and GA - 2,000 nests per season). The above conditions shall be met with the data from standardized surveys which would continue for at least five years after delisting.

2. At least 25 percent (348 miles) of all available nesting beaches (1,400 miles) is in public ownership, distributed over the entire nesting range and encompassing at least 50 percent of the nesting activity in each state.
3. All priority one tasks identified in the recovery plan have been successfully implemented.

**Green Sea Turtle**

The green sea turtle (*Chelonia mydas*) was federally listed as a protected species on July 28, 1978 (43 FR 32800). Breeding populations of the green turtle in Florida and along the Pacific Coast of Mexico are listed as endangered; all other populations are listed as threatened. Critical habitat for the green sea turtle has been designated for the waters surrounding Culebra Island, Puerto Rico, and its outlying keys (50 CFR 226.72 ).

The green sea turtle grows to a maximum size of about 4 feet and a weight of 440 pounds. It has a heart-shaped shell, small head, and single-clawed flippers. Hatchling green turtles eat a variety of plants and animals, but adults feed almost exclusively on seagrasses and marine algae.

The green sea turtle has a worldwide distribution in tropical and subtropical waters. They are generally found in fairly shallow waters (except when migrating) inside reefs, bays, and inlets. The sea turtle is attracted to lagoons and shoals with an abundance of marine grass and algae.

Major green turtle nesting colonies in the Atlantic occur on Ascension Island, Aves Island, Costa Rica, and Surinam. Open beaches with a sloping platform and minimal disturbance are required for nesting.

**Recovery Criteria for the United States**

The U.S. population of green sea turtles can be considered for delisting if, over a period of 25 years, the following conditions are met:

1. The level of nesting in Florida has increased to an average of 5,000 nests per year for at least six years. Nesting data shall be based on standardized surveys.
2. At least 25 percent (65 miles) of all available nesting beaches (260 miles) is in public ownership and encompasses at least 50 percent of the nesting activity.
3. A reduction in stage class mortality is reflected in higher counts of individuals on foraging grounds.
4. All priority one tasks identified in the Recovery Plan have been successfully implemented.

Leatherback Sea Turtle

The leatherback sea turtle (*Dermochelys coriacea*) was federally listed as an endangered species throughout its range in the U.S. on June 2, 1970 (35 FR 8491). Marine and terrestrial critical habitat for the leatherback sea turtle has been designated at Sandy Point on the western end of the island of St. Croix, U.S. Virgin Islands (50 CFR 17.95). This is the largest, deepest diving, and most migratory and wide ranging of all sea turtle species. The adult leatherback can reach 4 to 8 feet in length and weighing 500 to 2,000 pounds. Jellyfish are the main staple of its diet, but it is also known to feed on sea urchins, squid, crustaceans, tunicates, fish, blue-green algae, and floating seaweed.

The leatherback sea turtle is distributed worldwide in tropical and temperate waters of the Atlantic, Pacific, and Indian Oceans. Non-breeding leatherbacks have been recorded as far north as British Columbia, Newfoundland, the British Isles, and the Maritime Provinces of Canada and as far south as Argentina and the Cape of Good Hope (Pritchard, 1992).

Leatherback turtles nest on shores of the Atlantic, Pacific, and Indian Oceans. Adult females require sandy nesting beaches backed with vegetation and sloped sufficiently so the distance to dry sand is limited. Their preferred beaches have proximity to deep water and generally rough seas.

**Recovery Criteria for the United States**

The U.S. population of leatherbacks can be considered for delisting if the following conditions are met:

1. The adult female population increases over the next 25 years, as evidenced by a statistically significant trend in the number of nests at Culebra, Puerto Rico, St. Croix, U.S. Virgin Island, and along the east coast of Florida.
2. Nesting habitat encompassing at least 75 percent of nesting activity in U.S. Virgin Islands, Puerto Rico, and Florida is in public ownership.
3. All priority one tasks identified in the recovery plan have been successfully implemented.

Kemp's Ridley Sea Turtle

The Kemp's ridley sea turtle (*Lepidochelys kempii*) was listed as endangered on December 2, 1970 (35 FR 18320). The range of the Kemp's ridley includes the Gulf coasts of Mexico and the U.S., and the Atlantic coast of North America as far north as Nova Scotia and Newfoundland. Most Kemp's ridleys nest on the coastal beaches of the Mexican states of Tamaulipas and Veracruz, although a very small number of Kemp's ridleys nest consistently along the Texas coast (Turtle Expert Working Group, 1998). In addition, rare nesting events have been reported

in Florida, Alabama, South Carolina, and North Carolina. Hatchlings, after leaving the nesting beach, are believed to become entrained in eddies within the Gulf of Mexico, where they are dispersed within the Gulf and Atlantic by oceanic surface currents until they reach about 7.9 inches in length, at which size they enter coastal shallow water habitats (Ogren, 1989). Outside of nesting, adult Kemp's ridleys are believed to spend most of their time in the Gulf of Mexico, while juveniles and subadults also regularly occur along the eastern seaboard of the United States (U.S. Fish and Wildlife Service and National Marine Fisheries Service, 1992).

No critical habitat has been designated for the Kemp's ridley sea turtle.

#### **Recovery Criteria for the United States**

The goal of the plan is the recovery of the population so that the species can be reduced from endangered to threatened status. The Recovery Team members feel that the criteria for a complete removal of this species from the endangered species list need not be considered here, but rather left for future revisions of the plan. Complete removal from the Federal list would certainly necessitate that some other instrument of protection, similar to the Marine Mammal Protection Act, be in place and be international in scope. Kemp's ridley can be considered for downlisting to threatened under the ESA if the following four criteria are met:

1. Protection of the known nesting habitat and the water adjacent to the nesting beach (concentrating on the Ranch Nuevo area) and continuation of the bi-national project,
2. Elimination of the mortality from incidental catch from commercial shrimping in the U.S. and Mexico through the use of Turtle Excluder Devices (TEDs) and full compliance with the regulations requiring TED use,
3. Attainment of a population of at least 10,000 females nesting in a season,
4. All priority one recovery tasks in the recovery plan are successfully implemented.

#### **Life history (growth, life span, survivorship, and mortality)**

##### Loggerhead Sea Turtle

Loggerheads are known to nest from one to seven times within a nesting season (Talbert *et al.*, 1980; Richardson and Richardson, 1982; Lenarz *et al.*, 1981; among others); the mean is about 4.1 times (Murphy and Hopkins, 1984). The interval between nesting events within a season varies around a mean of about 14 days (Dodd, 1988). Mean clutch size varies from about 100 to 126 eggs along the southeastern U.S. Coast (NMFS and Service, 1991a). Nesting migration intervals of two to three years are most common in loggerheads, but the number can vary from one to seven years (Dodd, 1988). Age at sexual maturity is believed to be about 20 to 30 years (Turtle Expert Working Group, 1998).

Green Sea Turtle

Green turtles deposit from one to nine clutches within a nesting season, but the overall average is about 3.3 clutches. The interval between nesting events within a season varies around a mean of about 13 days (Hirth, 1997). Mean clutch size varies widely among populations. Average clutch size was 136 eggs in 130 clutches for one beach in Florida (Witherington and Ehrhart, 1989). Only occasionally do females produce clutches in successive years. Usually two, three, four, or more years intervene between breeding seasons (NMFS and Service, 1991b). Age at sexual maturity is believed to be about 20 to 50 years (Hirth, 1997).

Leatherback Sea Turtle

Leatherbacks nest an average of five to seven times within a nesting season, with an observed maximum of 11 (NMFS and Service, 1992). The interval between nesting events within a season is about nine to ten days. Average clutch size reported on one beach in Florida is 101 eggs (Martin, 1992). Nesting migration intervals of two to three years were observed in leatherbacks nesting on the Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands (McDonald and Dutton, 1996). Leatherbacks are believed to reach sexual maturity in six to ten years (Zug and Parham, 1996).

Kemp's Ridley Sea Turtle

Nesting occurs from April into July during which time the turtles appear off the Tamaulipas and Veracruz coasts of Mexico. Precipitated by strong winds, the females swarm to mass nesting emergences, known as *arribadas* or *arribazones*, to nest during daylight hours. Clutch size averages 100 eggs (U.S. Fish and Wildlife Service and National Marine Fisheries Service, 1992). Some females breed annually and nest an average of 1 to 4 times in a season at intervals of 10 to 28 days. Age at sexual maturity is believed to be between 7 to 15 years (Turtle Expert Working Group, 1998).

## Population dynamics

Loggerhead Sea Turtle

Loggerhead sea turtles nest within the continental U.S. from Louisiana to Virginia. Major nesting concentrations in the U.S. are found on the Atlantic and Gulf coasts of Florida and on the coastal islands of North Carolina, South Carolina, and Georgia (Hopkins and Richardson, 1984). From a global perspective, the southeastern U.S. nesting aggregation is of primary importance to the survival of the species because it is second in size only to nesting on islands in the Arabian Sea off Oman (Ross, 1982; Ehrhart, 1989; NMFS and Service, 1991a). The status of the Oman colony has not been evaluated recently, but its location in a part of the world that is vulnerable to disruptive events (e.g., political upheavals, wars, catastrophic oil spills) causes considerable concern (Meylan *et al.*, 1995). The loggerhead nesting groups in Oman, the southeastern U.S., and Australia account for about 88 percent of nesting worldwide (NMFS and Service, 1991a).

Total estimated nesting in the southeastern U.S. is approximately 68,000 to 90,000 nests per year (Florida FWC statewide nesting database 2002; Georgia DNR statewide nesting database 2002; SCDNR statewide nesting database 2002; NCWRC statewide nesting database 2002). About 80 percent of loggerhead nesting in the southeastern U.S. occurs in six Florida Atlantic coast counties - Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward counties (NMFS and Service, 1991a).

Adult loggerheads are known to migrate long distances between foraging areas and nesting beaches. During non-nesting years, adult females from U.S. beaches are distributed in waters off the eastern U.S. and throughout the Gulf of Mexico, Bahamas, Greater Antilles, and Yucatán.

Most loggerhead hatchlings originating from U.S. beaches are believed to spend their time in the open ocean of the North Atlantic gyre for an extended period of time, perhaps as long as 10 to 12 years, and are best known from the eastern Atlantic near the Azores and Madeira. Post-hatchlings have been found floating in association with *Sargassum* rafts. Once they become juveniles, they begin migrating to coastal areas in the western Atlantic where they become bottom feeders in lagoons, estuaries, bays, river mouths, and shallow coastal waters. These juveniles occupy coastal feeding grounds for a decade or more before maturing and making their first reproductive migration, the females returning to their birth beach to nest.

#### Green Sea Turtle

About 150 to 2,750 females are estimated to nest annually on beaches in the continental U.S. (Florida FWC, 2003) producing 500 to 9,000 nests. In the U.S. Pacific, over 90 percent of nesting throughout the Hawaiian archipelago occurs at the French Frigate Shoals, where about 200 to 700 females nest each year. Elsewhere in the U.S. Pacific, nesting takes place at scattered locations in the Commonwealth of the Northern Marianas, Guam, and American Samoa. In the western Pacific, the largest green turtle nesting group in the world occurs on Raine Island, Australia, where thousands of females nest nightly (Limpus et al., 1993). In the Indian Ocean, major nesting beaches occur in Oman where 30,000 females are reported to nest annually (Ross and Barwani, 1995).

Within the U.S., green turtles nest in small numbers in the U.S. Virgin Islands and Puerto Rico, and in larger numbers along the east coast of Florida, particularly in Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward counties (NMFS and Service, 1991b). Nesting also has been documented along the Gulf coast of Florida from Escambia County through Franklin County and from Pinellas County through Collier County (Meylan et al., 1995; Brost, 2003). The Florida green turtle nesting group is recognized as a regionally important colony. Green turtles have been known to nest in Georgia, but only on rare occasions (Winn, 1996). The green turtle also nests sporadically in North Carolina and South Carolina (Boettcher, 1998, 1996) and unconfirmed nests are reported in Alabama (Dailey, 1998).

Green turtles apparently have strong nesting site fidelity and often make long distance migrations between feeding grounds and nesting beaches. Hatchlings have been observed to seek refuge and food in *Sargassum* rafts.

Leatherback Sea Turtle

Nesting grounds are distributed worldwide, with the Pacific coast of Mexico supporting the world's largest known concentration of nesting leatherbacks. The largest nesting colony in the wider Caribbean region is found in French Guiana, but nesting occurs frequently, although in lesser numbers, from Costa Rica to Columbia and in Guyana, Surinam, and Trinidad (NMFS and Fish and Wildlife Service, 1992; National Research Council, 1990a).

Recent annual estimates of global nesting populations indicate 26,000 to 43,000 nesting females (Spotila *et al.*, 1996). The current largest nesting populations occur in the western Atlantic in French Guiana (4,500 to 7,500 females nesting/year), Colombia (estimated several thousand nests annually), in the western Pacific in West Papua (formerly Irian Jaya), and Indonesia (about 600 to 650 females nesting/year).

In the U.S., small nesting populations occur on the Florida east coast (100 females/year) (Florida FWC, 2003), Sandy Point, U.S. Virgin Islands (50 to 190 females/year) (Alexander *et al.*, 2002), and Puerto Rico (30 to 90 females/year). Leatherback turtles have been known to nest in Georgia, South Carolina, and North Carolina, but only on rare occasions (Murphy, 1996; Winn, 1996; Boettcher, 1998). Leatherback nesting also has been reported on the northwest coast of Florida (LeBuff, 1976; Longeliere *et al.*, 1997; Brost, 2003); a false crawl (non-nesting emergence) has been observed on Sanibel Island in southwest Florida (LeBuff, 1990).

Kemp's Ridley Sea Turtle

The 40,000 nesting females estimated from a single mass nesting emergence in 1947 reflected a much larger total number of nesting turtles in that year than exists today (Carr, 1963; Hildebrand, 1963). However, nesting in Mexico has been steadily increasing in recent years -- from 702 nests in 1985 to over 6,000 nests in 2000 (U.S. Fish and Wildlife Service, 2001). Despite protection for the nests, turtles have been and continue to be lost to incidental catch by shrimp trawls (U.S. Fish and Wildlife Service and National Marine Fisheries Service, 1992).

**Status and distribution**Loggerhead Sea Turtle

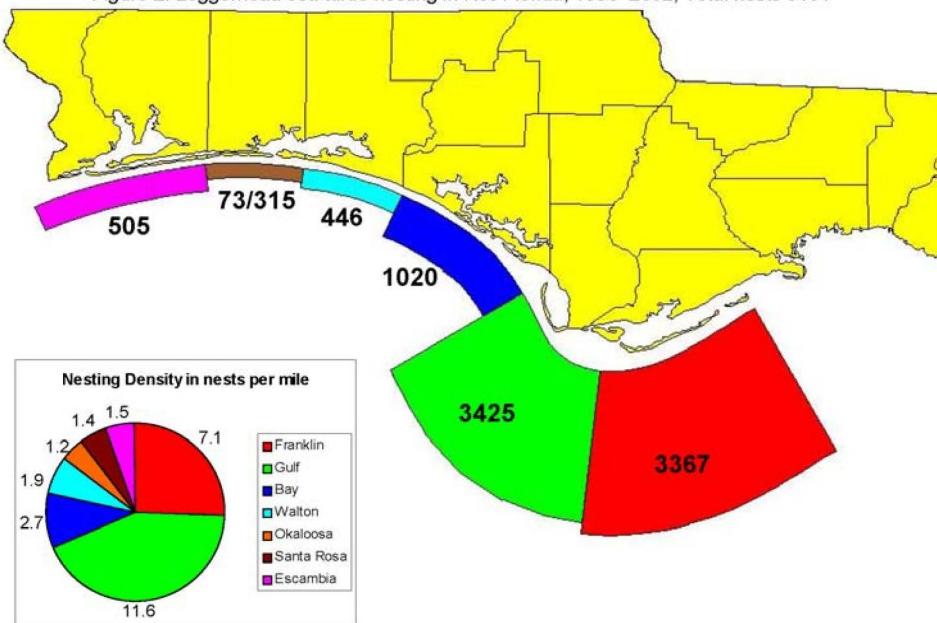
Genetic research (mtDNA) has identified five loggerhead nesting subpopulations in the western North Atlantic: (1) the Northern Subpopulation occurring from North Carolina south to around Cape Canaveral, Florida (about 29° N.); (2) South Florida Subpopulation occurring from about 29° N. on Florida's east coast to Sarasota on Florida's west coast; (3) Dry Tortugas, Florida, Subpopulation; (4) Northwest Florida Subpopulation occurring at Eglin Air Force Base and the beaches near Panama City; and (5) Yucatán Subpopulation occurring on the eastern Yucatán Peninsula, Mexico (Bowen *et al.*, 1993; Encalada *et al.*, 1998). These data indicate that gene flow between these four regions is very low. If nesting females are extirpated from one of these

regions, regional dispersal would not be sufficient to replenish the depleted nesting subpopulation.

The Northern Subpopulation has declined substantially since the early 1970s, but most of that decline occurred prior to 1979. No significant trend has been detected in recent years (Turtle Expert Working Group, 1998, 2000). Adult loggerheads of the South Florida Subpopulation have shown significant increases over the last 25 years, indicating that the population is recovering, although a trend could not be detected from the State of Florida's Index Nesting Beach Survey program from 1989 to 2002. Nesting surveys in the Northwest Florida and Yucatán Subpopulations have been too irregular to date to allow for a meaningful trend analysis (Turtle Expert Working Group, 1998, 2000).

Loggerheads are the most common nesting sea turtle and account for over 99 percent of the sea turtle nests in northwest Florida. The eastern portion of the region has the majority of loggerhead nesting (Figure 2). The loggerhead sea turtle nesting and hatching season for the region are generally considered to extend between May 1 and November 30. The earliest nest documented was on April 29 (St. Joseph Peninsula State Park) and the latest nest was on November 1 (Cape San Blas) (Brost, 2003). Nest incubation ranges from about 49 to 95 days.

Figure 2: Loggerhead sea turtle nesting in NW Florida, 1993–2002, Total nests 9151



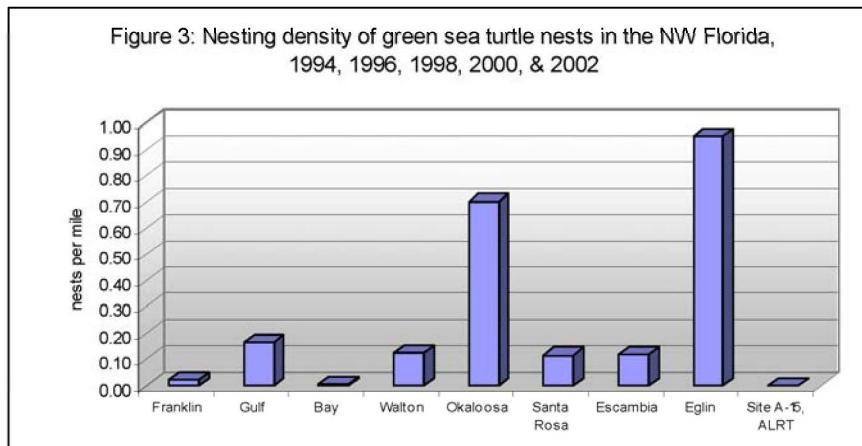
Threats to loggerhead sea turtles include incidental take from channel dredging and commercial trawling, longline, and gill net fisheries; loss or degradation of nesting habitat from coastal development and beach armoring; disorientation (attraction of hatchlings away from the water) by beachfront lighting; excessive nest predation by native and non-native predators; degradation of foraging habitat; marine pollution and debris; watercraft strikes; and disease. There is specific concern about the large amount of incidental take of juvenile loggerheads in the eastern Atlantic by longline fishing vessels from several countries.

In the southeastern U.S., major nest protection efforts and beach habitat protection are underway for most of the primary nesting areas, and progress has been made in reducing mortality from commercial fisheries in U.S. waters with the enforcement of turtle excluder device (TED) regulations. Many coastal counties and communities in Florida, Georgia, and South Carolina have developed beachfront lighting ordinances to reduce hatchling disorientations. Important U.S. nesting beaches have been and continue to be acquired for long-term protection. The migratory nature of loggerheads severely compromises these efforts once they move outside U.S. waters, however, because legal and illegal fisheries activities in some countries are causing high mortality on loggerhead sea turtle nesting populations of the western north Atlantic region. Due to the long range migratory movements of sea turtles between nesting beaches and foraging areas, long-term international cooperation is essential for recovery and stability of nesting populations.

#### Green Sea Turtle

Total population estimates for the green turtle are unavailable, and trends based on nesting data are difficult to assess because of large annual fluctuations in numbers of nesting females. For instance, in Florida, where the majority of green turtle nesting in the southeastern U.S. occurs, estimates range from 150 to 2,750 females nesting annually (Florida FWC, 2003). Populations in Surinam and Tortuguero, Costa Rica may be stable, but there is insufficient data for other areas to confirm a trend.

Green sea turtle nesting has been documented in all counties (but not on all beaches) in northwest Florida (Figure 3). The green sea turtle nesting and hatching season for this region extends from May 1 through October 31, the earliest nest was documented on May 20 (Santa Rosa Island) and the latest nest was documented on August 21 (Gulf Islands National Seashore). Nest incubation ranges from about 60 to 90 days. Nesting in northwest Florida has been consistently documented at least every other year since 1990 (Brost, 2003).



A major factor contributing to the green sea turtle's decline worldwide is commercial harvest for eggs and food. Fibropapillomatosis, a disease of sea turtles characterized by the development of multiple tumors on the skin and internal organs, is also a mortality factor and has seriously impacted green turtle populations in Florida, Hawaii, and other parts of the world. The tumors interfere with swimming, eating, breathing, vision, and reproduction. Turtles with heavy tumor burdens may die. Documented cases of fibropapillomatosis in northwest Florida are increasing (Redlow, 2003). Other threats include loss or degradation of nesting habitat from coastal development and beach armoring; disorientation of hatchlings by beachfront lighting; excessive nest predation by native and non-native predators; degradation of foraging habitat; marine pollution and debris; watercraft strikes; and incidental take from channel dredging and commercial fishing operations.

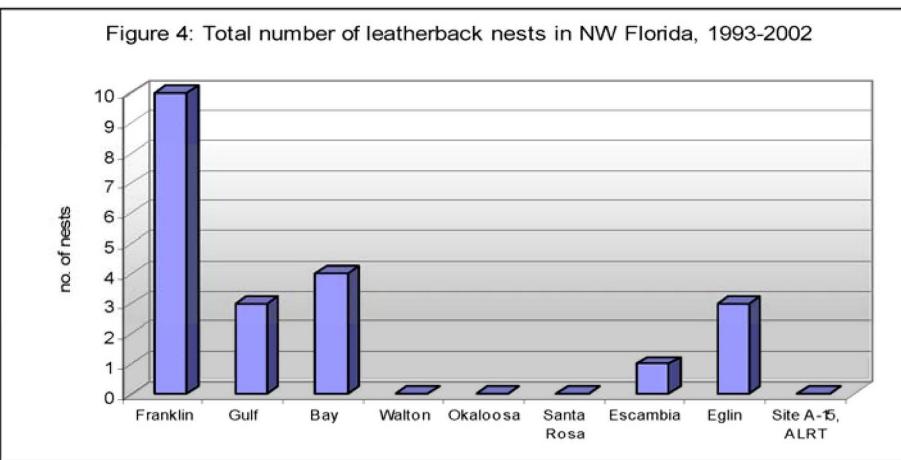
In the southeastern U.S., major nest protection efforts and beach habitat protection are underway at most of the larger nesting areas, and significant progress has been made in reducing mortality from commercial fisheries in U.S. waters with the enforcement of TED regulations. Many coastal counties and communities in Florida have developed beachfront lighting ordinances to reduce hatchling disorientations. Important U.S. nesting beaches have been and continue to be acquired for long-term protection. The Service and NOAA-Fisheries have been funding research on the fibropapilloma disease for several years to expand knowledge of the disease with the goal of developing an approach for remedying the problem. Due to the long range migratory movements of sea turtles between nesting beaches and foraging areas, long-term international cooperation is essential for recovery and stability of nesting populations.

#### Leatherback Sea Turtle

Declines in leatherback nesting have occurred over the last two decades along the Pacific coasts of Mexico and Costa Rica. The Mexican leatherback nesting population, once considered to be the world's largest leatherback nesting population (65 percent of worldwide population), is now

less than one percent of its estimated size in 1980. Spotila *et al.*, (1996) recently estimated the number of leatherback sea turtles nesting on 28 beaches throughout the world from the literature and from communications with investigators studying those beaches. The estimated worldwide population of leatherbacks in 1995 was about 34,500 females on these beaches with a lower limit of about 26,200 and an upper limit of about 42,900. This is less than one third the 1980 estimate of 115,000. Leatherbacks are rare in the Indian Ocean and in very low numbers in the western Pacific Ocean. The largest population is in the western Atlantic. Using an age-based demographic model, Spotila *et al.*, (1996) determined that leatherback populations in the Indian Ocean and western Pacific Ocean cannot withstand even moderate levels of adult mortality and that even the Atlantic populations are being exploited at a rate that cannot be sustained. They concluded that leatherbacks are on the road to extinction and further population declines can be expected unless action is taken to reduce adult mortality and increase survival of eggs and hatchlings.

Documented leatherback nests are rare in northwest Florida. From 1993 to 2002, a total of 26 nests have been reported on northwest Florida beaches: fifteen in Franklin County, four in Bay County, three in Okaloosa County, three in Gulf County, and one in Escambia County (Brost, 2003) (Figure 4). The first recorded leatherback nest in the region was in 1974, on St. Vincent Island, Franklin County. The majority of the nests have had low natural hatching success. The greatest number of successful nests in any one season occurred in 2000, when three leatherback nest were documented to produce hatchlings that successfully emerged from the nest. One nest was on the Ft. Pickens Unit of Gulf Islands National Seashore, Escambia County and two of the nests were on Eglin Air Force Base, Santa Rosa Island, Okaloosa County. The leatherback sea turtle nesting and hatching season for this region extends from late April through October 31. For confirmed nesting, the earliest nest was documented on April 25 (St. George Island) and the latest nest documented on June 19 (Eglin). Documented nest incubation in northwest Florida ranges from about 63 to 84 days (Brost, 2003; Miller, 2001b; Nicholas, 2001).



The decline of the Pacific leatherback population is believed primarily to be the result of exploitation by humans for the eggs and meat, as well as incidental take in numerous commercial fisheries of the Pacific. Other factors threatening leatherbacks globally include loss or degradation of nesting habitat from coastal development; disorientation of hatchlings by beachfront lighting; excessive nest predation by native and non-native predators; degradation of foraging habitat; marine pollution and debris; and watercraft strikes.

It is crucial to maximize hatchling production for the remaining leatherback nesting that occurs along the extensive Pacific coasts of Mexico, Costa Rica, and other Central American countries. Due to the long range migratory movements of sea turtles between nesting beaches and foraging areas, long-term international cooperation is essential for recovery and stability of nesting populations. From 1998 to 1999, the Service provided annual funding to assist recovery efforts for the leatherback in Mexico and Costa Rica, including support for nesting surveys and nest protection. In the southeastern U.S. and U.S. Caribbean, major nest protection efforts and beach habitat protection are underway for most of the important nesting areas. In addition, research is underway to develop technologies to minimize leatherback mortality associated with the longline fishery.

Many coastal counties and communities have developed beachfront lighting ordinances to reduce hatchling disorientations. Important U.S. nesting beaches have been and continue to be acquired for long-term protection.

#### Kemp's Ridley Sea Turtle

Eleven ridley nests have now been documented in Florida in Volusia, Lee, Sarasota, Pinellas, and Escambia counties (Brost, 2003; Nicholas, 2001). Hatchlings, after leaving the nesting beach, are believed to become entrained in eddies within the Gulf of Mexico, where they are dispersed within the Gulf and Atlantic by oceanic surface currents until they reach about 8 inches long, when they enter coastal shallow water habitats.

The decline of this species was primarily due to human activities, including the direct harvest of adults and eggs and incidental capture in commercial fishing operations. Today, under strict protection, the population appears to be in the early stages of recovery. The recent nesting increase can be attributed to full protection of nesting females and their nests in Mexico resulting from a bi-national effort between Mexico and the U.S. to prevent the extinction of the Kemp's ridley, and the requirement to use turtle excluder devices in shrimp trawls both in the United States and Mexico.

The Mexico government also prohibits harvesting and is working to increase the population through more intensive law enforcement, by fencing nest areas to diminish natural predation, and by relocating all nests into corrals to prevent poaching and predation. While relocation of nests into corrals is currently a necessary management measure, this relocation and concentration of eggs into a "safe" area is of concern since it makes the eggs more susceptible to reduced viability due to movement-induced mortality, disease vectors, catastrophic events like hurricanes, and marine predators once the predators learn where to concentrate their efforts.

**Common threats to all sea turtles in Northwest Florida**Coastal development

Loss of nesting habitat related to development of the coastline has had the greatest impact on nesting sea turtles in this region. Beachfront development not only causes the loss of suitable nesting habitat but can result in the disruption of powerful coastal processes accelerating erosion and interrupting the natural shoreline migration (National Research Council, 1990b). This may in turn cause the need to protect upland structures and infrastructure by armoring, groin placement, beach berm construction, and beach nourishment which cause changes in, additional loss or impact to the remaining sea turtle habitat.

Hurricanes

A predominant threat to sea turtle nesting is tropical storms and hurricanes. In general, hurricanes result in severe erosion of the beach and dune systems. Overwash and blowouts are common on barrier islands. Hurricanes and other storms can result in the direct or indirect loss of sea turtle nests, either by erosion or washing away of the nests by wave action or inundation or "drowning" of the eggs or hatchlings developing within the nest or indirectly by loss of nesting habitat. Depending on their frequency, storms can affect sea turtles on either a short-term basis (nests lost for one season and/or temporary loss of nesting habitat) or long term, if frequent (habitat unable to recover). How hurricanes affect sea turtle nesting also depends on its characteristics (winds, storm surge, rainfall), the time of year (within or outside of the nesting season), and where the northeast edge of the hurricane crosses land.

Because of the limited remaining nesting habitat, frequent or successive severe weather events could threaten the ability of certain sea turtle populations to survive and recover. Sea turtles evolved under natural coastal environmental events such as hurricanes. Hurricanes were probably responsible for maintaining coastal beach and dune nesting habitat through repeated cycles of destruction, alteration, and recovery. The extensive amount of pre-development coastal beach and dune habitat allowed sea turtles to survive even the most severe hurricane events. It is only within the last 20 to 30 years that the combination of habitat loss to beachfront development and destruction of remaining habitat by hurricanes has increased the threat to sea turtle survival and recovery. On developed beaches, typically little space remains for sandy beaches to become re-established after periodic storms. While the beach itself moves landward during such storms, reconstruction or persistence of structures at their pre-storm locations can result in a major loss of nesting habitat.

Beachfront Lighting

Beachfront lighting may cause disorientation (loss of bearings) and misorientation (incorrect orientation) of sea turtle hatchlings. Visual signs are the primary sea-finding mechanism for hatchlings (Mrosovsky and Carr, 1967; Mrosovsky and Shettleworth, 1968; Dickerson and Nelson, 1989; Witherington and Bjoerndal, 1991). Artificial beachfront lighting is a documented

cause of hatchling disorientation and misorientation on nesting beaches (Philbosian, 1976; Mann, 1977; Conti, 2003). The emergence from the nest and crawl to the sea is one of the most critical periods of a sea turtle's life. Hatchlings that do not make it to the sea quickly become food for ghost crabs, birds, and other predators or become dehydrated and may never reach the sea. Some types of beachfront lighting attract hatchlings away from the sea while some lights cause adult turtles to avoid stretches of brightly illuminated beach. Research has documented significant reduction in sea turtle nesting activity on beaches illuminated with artificial lights; relative to adjacent areas (Witherington, 1992). During the 2002 sea turtle nesting season in Florida, over 43,000 turtle hatchlings were disoriented. Lighting associated with condominiums had the greatest impact causing disorientation/misorientation of 35 percent. Other causes included street lights, parking lot lights, single family residences, and sky glow (Conti, 2003).

Beachfront lighting from military facilities and coastal development has caused disorientation of sea turtle hatchlings that emerge from nests on Eglin, Santa Rosa Island. Prior to Hurricanes Opal and Erin, Eglin was in the process of converting lighting on military beachfront structures to sea turtle friendly fixtures. After the hurricanes, conversion was slowed by the process of rebuilding of new structures and funding availability. The hurricanes also cause erosion of dunes that resulted in more light reaching the beach. On new military related facilities, sea turtle lighting is being included in the design and construction. Conversion of existing facilities has been completed (Miller, 2002). Disorientation from the sky glow of Destin and Ft. Walton Beach also affects hatchlings on Eglin beaches (Miller, 2002).

#### Predation

Depredation by a variety of predators can considerably decrease sea turtle nest hatching success. Depredation and harassment or both of nesting turtles, eggs, nests and hatchlings by native and non-native species, such as raccoon, coyote, fox, feral hog, cats, birds, and ghost crab, have been documented on the Atlantic and Gulf coasts of Florida (Daniel et al., 2002; Northwest Florida Partnership, 2000; Leland, 1997; Maxwell, 2002; NMFS and Service, 1991a). As nesting habitat dwindles, it is essential that nest production be naturally maximized so the turtles may continue to exist in the wild.

Predators of sea turtle nests and hatchlings on Eglin, Santa Rosa Island have included raccoon, coyote, red fox, ghost crabs, and ants. Documented depredation rates on Eglin increased from 10 percent of the loggerhead nests in 1993 to 67 percent of the loggerhead nests in 1997. An intensive integrated predator control approach was implemented on the island during the 1998 nesting season (Miller, 2001a). Reduction in predation rates improved slightly in 1998 (54 percent) and by 2001, the rate was reduced to zero percent.

Eglin's predator control program has been part of the State/Federal interagency partnership for protection of threatened and endangered species on coastal public lands in northwest Florida through predator control. The partners have contracted with the U.S. Department of Agriculture to implement the predator control plan since 1997. It has been successful throughout the region. Continued low predation rates of sea turtle nests throughout northwest Florida have been documented. The integrated predator approach begins with protection of the sea turtle nests as

soon as they are laid. As nests are located the morning after they are deposited, a flat screen is placed on top of each nest. As needed, direct control of problem predators is also accomplished.

#### Driving on the Beach

The operation of motor vehicles on the beach affects sea turtle nesting by interrupting a female turtle approaching the beach; headlights disorienting or misorienting emergent hatchlings; vehicles running over hatchlings attempting to reach the ocean; and vehicle tracks traversing the beach interfere with hatchlings reaching the ocean. Apparently, hatchlings become diverted not because they cannot physically climb out of the rut (Hughes and Caine, 1994), but because the sides of the track cast a shadow and the hatchlings lose their line of sight to the ocean horizon (Mann, 1977). The extended period of travel required to negotiate tire tracks and ruts may increase the susceptibility of hatchlings to dehydration and depredation during migration to the ocean (Hosier *et al.*, 1981). Driving directly above or over incubating egg clutches or on the beach can cause sand compaction which may result in adverse impacts on nest site selection, digging behavior, clutch viability, and emergence by hatchlings, decreasing nest success and directly killing pre-emergent hatchlings (Mann, 1977; Nelson and Dickerson, 1987; Nelson, 1988). Vehicle driving on narrow beaches where driving is concentrated on the high beach and foredune may contribute to beach erosion.

Driving on the beach at Eglin is only allowed for military missions including the protection, conservation, management and research of natural resources. In 1999, Eglin and the Service underwent formal consultation regarding the Theater Missile Defense Program on Cape San Blas and Okaloosa/Santa Rosa Island and in 2001 on Eglin's Natural Resources Integrated Management Plan (INRMP). Final conclusions of both consultations included a protocol for driving on the beach during sea turtle nesting season.

#### Sea Turtles Nesting

##### Sea Turtle Nest Monitoring on Eglin, Santa Rosa Island

The INRMP provides guidelines/regulations to address conservation and management of sea turtles on Santa Rosa Island. Eglin initiated conservation and management of sea turtles on base controlled lands in 1987. The monitoring is conducted under State of Florida permit no. 076 (Brost, 2003). Nesting surveys are conducted seven days a week from May 15 to October 31. However, surveys may continue into mid-November if nests have not hatched. Eglin participates in the State's index nesting beach survey program (INBS). The beachfront is divided into one-half mile segments for reporting purposes. Surveys begin at sunrise. Approximately 17 miles of Santa Rosa Island are surveyed by using all terrain vehicles (ATVs). Approximately 4 miles of the beach are open to the public and 13 miles are restricted access. Turtle crawls are identified as a true nesting crawl or false crawl. Nests are marked with stakes and surrounded with surveyor flagging tape, and if needed screened to prevent predation. The marked nests are monitored throughout the incubation period for storm damage, predation, hatching activity and

hatch and emergence success. Nests are relocated within the first 12 hours of being deposited, or before 9 a.m. the morning following deposition, if threatened by erosion or inundation.

**Analysis of the species/critical habitat likely to be affected**

Santa Rosa Island is a barrier island and part of a complex and dynamic coastal system that is continually responding to inlets, tides, waves, erosion and deposition, longshore sediment transport, and depletion, and fluctuations in sea level. The location and shape of barrier islands beaches perpetually adjusts to these physical forces. Winds move sediment across the dry beach forming dunes and the island interior landscape. The natural communities contain plants and animals that are subject to shoreline erosion and deposition, salt spray, wind, drought conditions, and sandy soils. Vegetative communities include foredunes, primary and secondary dunes, interdunal swales, sand pine scrub, and maritime forests. During storm events, overwash is common and may breach the island at dune gaps or other weak spots, depositing sediments on the interior and backsides of islands, increasing island elevation and accreting the sound shoreline. Breaches may result in new inlets through the island.

The ALRT activities are planned to take place for the foreseeable future. The proposed activities have the potential to adversely affect female sea turtles, their nests, and hatchlings within the proposed Action Area. Eglin has proposed a variety of conservation measures to be incorporated into the ALRT activities. The measures would reduce some of the potential impacts. The effect of the ALRT activities with incorporation of the proposed conservation measures on each of the sea turtle species' overall survival and recovery is considered in this biological opinion.

Effects include the physical presence of structures in the surf zone and on the beach and dune habitat during nighttime hours when nesting and hatchling emergence from nests predominately occur. Female turtles may false crawl or abort the nesting process or be injured or entrapped and hatchling turtles injured or entrapped as they emerge from the nest and crawl to the Gulf of Mexico. Indirectly, the project could affect the behavior of adult female sea turtles approaching the beach and selecting a suitable site to nest or hatchling sea turtles emerging from the nest and crawling to the Gulf of Mexico and becoming misoriented or disoriented from noise, human presence, and erosion of the beach and dunes. Erosion of the beach and dune system caused by the placement and removal of the structures could affect the quality of nesting habitat.

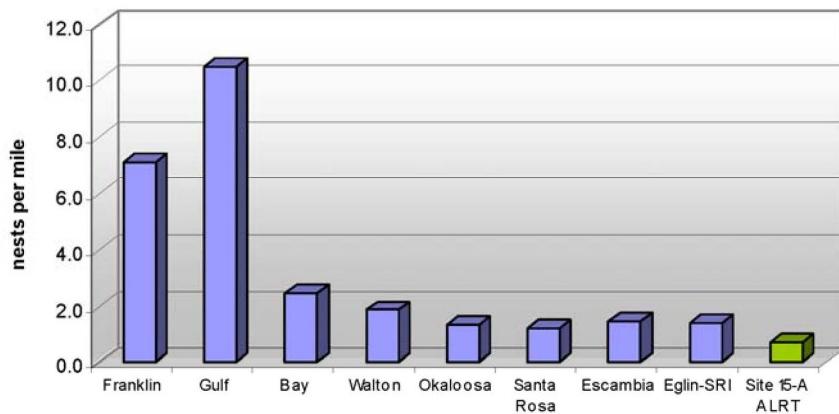
Critical habitat has not been designated for sea turtles in the continental United States; therefore, the proposed action would not result in an adverse modification.

**ENVIRONMENTAL BASELINE****Status of the Species Within the Action Area**

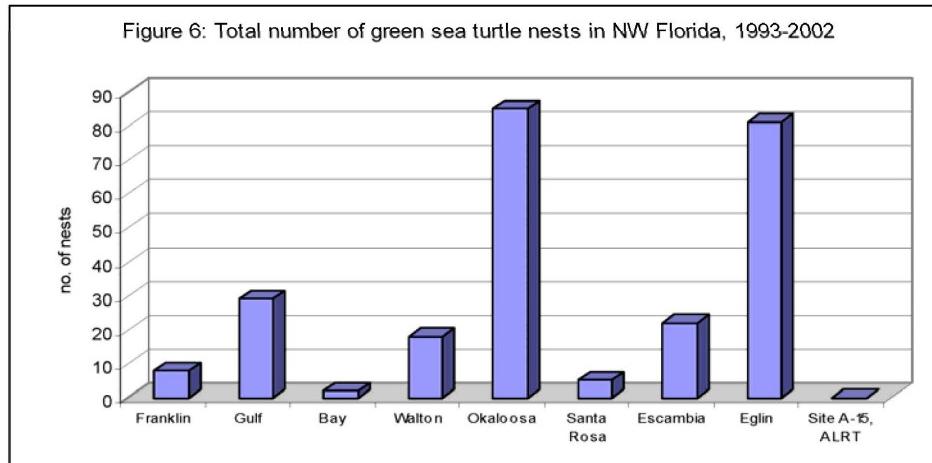
The loggerhead sea turtle nesting and hatching season for northern Gulf of Mexico beaches extends from May 1 through November 30. However, based on 14 years of data analyzed by Eglin, sea turtle nesting and hatching season on Santa Rosa Island occurs between mid-May and

mid-November. Loggerhead nesting within the Action Area averaged about 1.4 nests per mile from 1993 to 2003 (Figure 5). During that time, 328 loggerhead nests and 227 false crawls were documented. The nests had a mean hatching success rate of 45 percent (range 0 to 91 percent). Of those 265 nests, 46 were relocated to higher beach elevations within the same vicinity of the original nest location. The relocated nests had a mean hatching success rate of 34 percent (range 0 to 74 percent). Loggerhead nesting is evenly distributed along the 17 miles of Gulf beachfront on Santa Rosa Island within Eglin lands with a mean annual nesting density of 1.4 nests per mile. However, within the ALRT project area the mean annual nest density is lower at 0.71 nest per mile (Figure 5).

Figure 5: Average annual loggerhead sea turtle nesting density in NW Florida, 1993-2002



Eglin Santa Rosa Island supports the highest number of green sea turtle nests in northwest Florida (Figure 6). Green turtle nesting has been documented on Santa Rosa Island every other year since 1990. There were a total of 80 green turtle nests during the 1994, 1996, 1998, 2000, and 2002 seasons. The majority of the nests have been located between Sites A-7 and A-13A.



Leatherback nesting was documented on Eglin Santa Rosa Island for the first time in 2000. Three nests that were thought to be leatherback nests were located, two of the nests hatched, and one was confirmed by identification of hatchlings (Miller, 2001b). All three nests were found on the restricted portion of the island adjacent to but not within the Action Area.

No Kemp's ridley sea turtle nests have been documented on Eglin beaches on Santa Rosa Island. In 1998, a ridley nest was documented on Gulf Islands National Seashore, Escambia County, Florida and another was documented on Bon Secour National Wildlife Refuge in Alabama (Nicholas, 2001; MacPherson, 2002). In 2001, a second record of a Kemp's ridley nest was documented on the Bon Secour National Wildlife Refuge (South, 2001).

#### Factors Affecting Species Environment within the Action Area

Eglin participates in the State of Florida Sea Turtle Stranding and Salvage Network (STSSN) and completes and submits STSSN reports as appropriate. From 1989 to 2002, 57 sea turtles were documented to strand on Eglin beaches or Gulf front lands. Average annual strandings are approximately 4 per year (range 1 to 9). The species that were stranded included: loggerhead (29), leatherback (10), ridley (6), green (6), and unidentified (2). Nine of the strandings were found on the public beaches of Eglin nearest Site A-1. The majority of the strandings were located on the restricted-access portions of the island near Site A-10. Nine strandings were on the shoreline of Choctawhatchee Bay within the boundaries of Eglin (Miller, 2003). Strandings in northwest Florida have increased 83 percent from the previous ten-year average in the 1990s (Redlow, 2003).

#### Artificial Beachfront Lighting

Beachfront lighting management has been implemented for military controlled facilities on Santa Rosa Island, and nests are no longer relocated because of the potential for lighting

disorientations. By far, the sky glow from Ft. Walton Beach north of Santa Rosa Sound causes the greatest number of disorientations. Other noted causes include lighting from beachfront development (condominiums, restaurant, and hotels), Base housing across the Sound on Hurlburt Field, and lights at Sites A-4, A-10, and A-11 (FWC/ Florida Marine Research Institute Marine Turtle Hatchling Disorientation Incident Report Forms, 1993 to 2000).

#### EFFECTS OF THE ACTION

Certain aspects of the ALRT activities will take place on the beachfront of Santa Rosa Island. During some years, the testing will take place during sea turtle nesting and hatching season, which in northwest Florida usually occurs between May 1 and November 30 but on occasion nesting may occur in April. However, based on 14 years of data analyzed by Eglin, sea turtle nesting and hatching season on Santa Rosa Island occurs between mid-May and mid-November. Thus, monitoring is limited currently to this time frame. Sea turtles are nocturnal nestors and emergence of hatchlings from the nest is usually during the night. Direct impacts to nesting or hatching sea turtles could occur from the physical presence of structures in the surf zone and on the beach at night including the presence of and test participants on the beach. Indirect impacts could include changes in the nesting behavior of adult female sea turtles, change in the behavior of hatching sea turtles as they emerge from the nest and crawl to the water, missed nests and hatching events during routine nesting surveys, alteration to the nest incubation environment from relocation, and temporary or long term alterations to the island's beach and dune topography from placement of structures within the surf zone or on the beach. Protective, avoidance, and minimization measures have been incorporated into the ALRT activities to avoid or minimize the potential impacts.

However, even with the incorporation of protective, avoidance, and minimization measures, some aspects of the ALRT testing may adversely affect sea turtles because the activities occur during the night during sea turtle nesting and hatching season and affect nesting or hatching sea turtles or because the action may negatively affect sea turtle nesting habitat. Although only 300 feet in length of surf zone, beachfront, and dune habitat will actually be used for ALRT test activities at Test Site A-15 our analysis includes the entire test site covering ½ mile and for the entire nesting/hatching season (May 15 through November 15).

The surf zone, beach, and dunes within the test area are where adult female sea turtles nest or traverse to and from nests and hatching sea turtles emerge from those nests and crawl to the Gulf of Mexico. Eglin has documented sea turtle nesting on Santa Rosa Island since 1989. Thus, effects to nesting and hatching sea turtles could occur as a result of the ALRT program; (1) occurring on the beach of Santa Rosa Island, (2) being scheduled during sea turtle nesting season and, (3) being conducted at night. The ALRT program is proposed to be an ongoing activity at Eglin.

Proximity of Action: The ALRT activities could occur directly in and adjacent to nesting habitat for sea turtles and dune habitats that ensure the stability and integrity of the barrier island. Specifically, the training could potentially impact nesting and hatching loggerhead, green, leatherback, and Kemp's ridley sea turtles.

Distribution: The ALRT activities that may impact nesting and hatchling sea turtles could occur along approximately 300 feet of Gulf of Mexico beachfront. Specifically, the activities would cover a portion of INBS Zone 8, at Site A-15, Santa Rosa Island, Eglin. However, the Action Area to be analyzed will be the entire ½ mile of the zone.

Timing: The timing of the ALRT activities could directly and indirectly impact nesting and hatchling sea turtles when conducted at night between May 15 and November 15.

Nature of the Effect: ALRT activities could change the nesting behavior of adult female sea turtles or diminish the nesting success, change the behavior of hatchling sea turtles, and result in nests or hatching events being missed during the daily survey of the subject beachfront. Any decrease in productivity and or survival rates would contribute to vulnerability and endangerment of loggerhead, green, leatherback, and Kemp's ridley sea turtles. In addition, changes to the beach topography may result from the prolonged presence of structures on the beach.

Duration: The length of the ALRT testing is variable and, depending on whether it is conducted within or out side the sea turtle nesting season, it could affect nesting success, behavior of nesting turtles, and result in nests being missed during reporting. To adequately evaluate the greatest risk of the project the analysis covers the entire test site and the entire sea turtle nesting season.

Disturbance frequency: The ALRT activities may have a long-term presence on Santa Rosa Island. This could result in regular disturbance on the nesting populations of the sea turtles on the island. Annual use of Test Site A-15 for this activity could impact nesting success, hatching success and hatchling emergence.

Disturbance intensity and severity: Depending on the timing and length of the ALRT activities during sea turtle nesting season, effects to the loggerhead and green sea turtle populations of northwest Florida, and potentially the U.S., could be important. For loggerhead sea turtles, especially, extirpation of the northwest Florida sub-population would probably not be replenished by regional dispersal from other nesting sub-populations. The significance of the green sea turtle nesting at Santa Rosa Island to the conservation of the U.S. population of green sea turtles is unknown.

#### Analysis for Effects of the Action

##### Direct and indirect effects

The ALRT activities within the Action Area may vary from year to year but are anticipated to occur during the sea turtle nesting season on Eglin between May 15 and November 15. Thus, impacts to sea turtles could potentially occur. The impacts are expected to be a result of the physical presence of structures within the surf zone, beach and dune habitat at night. Impacts may also include the presence of test participants on the beach and dunes during the project.

The ALRT project is to cover only 300 feet of the INBS Zone 8 ( $\frac{1}{2}$  mile). For a worst-case scenario, we have analyzed impacts using the entire zone instead of only 300 feet of the zone and nesting/hatching activities that could occur for the entire season (May 15 through November 15). For loggerhead sea turtles, on an average annual basis, 0.71 nest could be laid within the ALRT Action Area. For green sea turtles, on an average annual basis, 0.07 nest is estimated to be laid within the ALRT Action Area. Because of the rarity of nesting activity and paucity of data on leatherback and Kemp's ridley nesting in the northwest Florida, it is not anticipated that either species would be potentially impacted by the training activities (Table 1).

Table 1: Sea Turtle Nesting within the Action Area at Site A-15 (INBS zone 8) of Gulf of Mexico beachfront.

	Loggerhead	Green	Leatherback	Kemp's Ridley
Total number nests	10*	0**	0	0
Peak nesting period (60 days)	June and July	June and July	May-June nesting outside Action Area	no data
Average annual no. of nests laid within zone 8 per entire nesting season documented	0.71 nest	0.07 nest	insufficient data	no data
Average annual total no. of nests misidentified as false crawls (7%)	0.05 nests	0.005 nests		
<b>Total Nests expected annually</b>	<b>0.76 nest</b>	<b>0.08 nest</b>		
Avg. number of female turtles nesting in a season***	0.20 female	0.024 female	insufficient data	no data
Female turtles false crawling	0.21 female	0.002 female		
Total number of female turtles nesting in a season	<b>0.42 female</b> <b>(round to 1 female)</b>	0.03 female <b>(round to 1 female)</b>		
Avg. no. of nests hatching per season barring storms or catastrophic events	<b>0.76 nests</b> <b>(round to 1 nest)</b>	<b>0.08 nest</b> <b>(round to 1 female)</b>	insufficient data	no data
Total hatchlings	<b>100-126 hatchlings+</b>	<b>136 hatchlings++</b>		
<b>Totals (annual per season)</b>	<b>1.0 nest</b> <b>1.0 female</b> <b>100-126 hatchlings</b>	<b>1.0 nest</b> <b>1.0 females</b> <b>136 hatchlings</b>	insufficient data	no data

\*based on data from 1989-2003

\*\*based on data from 1990-2003

\*\*\*Loggerhead turtles nests an average of 4.1 times per season and green turtles nest an average of 3.3 times per season

+Average number of eggs in a nest is 100-126

++Average number of eggs in a nest is 136

Within the 6-month sea turtle nesting season, the period of greatest potential for impacts to all the sea turtle species would be at night during peak nesting in June and July when the majority of the nests are laid and during August and September when the majority of the nests hatch. Of the total number of loggerhead sea turtle nests laid on Eglin beaches, 81 percent of the nests would be laid during June and July. Accordingly, the same number of nests would be expected to hatch during August and September. Of green sea turtle nests, 75 percent of the nests would be laid during June and July. Accordingly, a similar number of nests would be expected to hatch during August and September. To minimize the adverse impacts to sea turtle nests, daily nesting surveys are needed. While day nesting surveys would reduce these impacts, nests may be inadvertently missed or misidentified as false crawls during the surveys. Even under the best of conditions, about 7 percent of the nests can be misidentified as false crawls by experienced sea turtle nest surveyors (Schroeder, 1994). Thus, including the potential for missed nests and peak nesting and hatching season, it is estimated that up to 1 loggerhead and 1 green sea turtle nest may be impacted from the ALRT activities when the activities are conducted within sea turtle nesting season. Although female sea turtles do not nest every year, during the year in which they nest they usually lay multiple nests (loggerhead 4.1 nests per season and green 3.3 nests per season). It is also expected that 1 loggerhead sea turtle and 1 green sea turtle could false crawl due to barriers to the nesting beach, disruption of the nesting process, or aversion to the nesting beach. However, the spacing of the structures on the beach should minimize the potential of a sea turtle becoming trapped or hindered by the structures. Since only one female turtle is expected to come ashore in the project during the nesting season so the risk is further decreased.

Using data collected over 14 years, Eglin estimates that 85 percent of loggerhead and green turtle nests hatch after 60 to 80 days of incubation. It is estimated that 126 loggerhead sea turtle hatchlings (1 nest) and 136 green sea turtle hatchlings (1 nest) could be impacted by the ALRT activities. The majority of the potential impact would result from a nest hatching while the ALRT activity is ongoing and the hatchlings being attracted to the lights used by the test participants. Attraction to the lights could cause the hatchlings to become misoriented (incorrect orientation) or disoriented (loss of bearings). Visual cues are the primary sea-finding mechanism for hatchlings (Mrosovsky and Carr, 1967; Mrosovsky and Shettleworth, 1968; Dickerson and Nelson, 1989; Witherington and Bjorndal, 1991). Artificial beachfront lighting is a well documented cause of hatchling disorientation and misorientation on nesting beaches (Philibosian, 1976; Mann, 1977). This could inadvertently cause or delay the hatchlings from reaching the water. The emergence from the nest and crawl to the sea is one of the most critical periods of a sea turtle's life. Hatchlings that do not quickly make it to the sea become food for ghost crabs, birds or other predators, or become dehydrated and may never reach the sea. Assuring that hatchlings reach the water can be achieved by close monitoring of nests that are about to hatch.

Minimal research has been conducted to ascertain the negative affects to nesting sea turtles from noise, vibrations, presence of people, or a combination of all these factors. Sea turtles are most prone to human disturbance during the initial phases of nesting when they emerge from the sea, select a nest site, and excavate the egg chamber (Hirth and Samson, 1987 as cited in Witherington and Martin, 2000). Witherington and Martin (2000) also noted that the presence of people moving within the field of view of a turtle may cause abandonment of the nesting

process. Although sea turtles are less prone to abandon nesting attempts once egg deposition has begun, the normal post-egg laying behavior of covering and camouflaging the nest site can be abbreviated if a turtle is disturbed. Studies have shown that “watched” and hand-illuminated nesting turtles have shorter than average nest covering and camouflaging times (Johnson *et al.*, 1996 and Hirth and Samson, 1987 as cited in Witherington and Martin, 2000). Depending on the stage of nesting or hatching, if turtles are sighted on the beach during the ALRT activities, there are certain actions that can be taken to avoid or minimize disturbance to the turtles. In addition, it is estimated that only one female turtle is expected to come ashore in the project during the nesting season so the risk is further decreased.

Female turtles approaching the beach may be hindered or entrapped by the structures placed in the surf zone. The structures are to be covered by 2 to 3 feet of water at high tide. However, during the low tide this coverage could be reduced in height by 0.5 feet. Sea turtles encounter structures under the water in their natural habitat and are expected to be able to avoid or go between the structures. In addition, it is estimated that only one female turtle is expected to come ashore to nest in the project so the risk is further decreased.

During the times that concertina wire will be used on the beach seaward of the mine arrays, female turtles locating a nesting site could become entangled and severely injured by the wire. The proposed use of fence material to direct the turtles away from the wire to adjacent clear beaches would greatly decrease the potential risk of injury to the nesting turtles.

The ALRT activities, regardless of when they are conducted, may affect the stability, topography, and ecological integrity of Test Site A-15 and the surrounding coastline on Santa Rosa Island. Effects from the ALRT activities may continue to affect sea turtle nesting on the beach and adjacent beaches from year to year for the foreseeable future. Repeated burial or moving structures on the within the surf zone, beach, and dune habitat could affect the formation of the pioneer dunes system leaving the coastline vulnerable to wind and wave action.

The dynamic coastal barrier island is important in not just providing habitat for endangered species but as protection for inland areas, acting as a buffer against wind and waves on a daily basis and probably more importantly, during hurricanes and other severe weather events. However, dunes are fragile and can be easily eroded or worn away. Dunes are created by the sand blowing up from the beach and accumulating around vegetation. The dunes increase in size as the plant roots trap and stabilize the shifting sands. When the plants are destroyed, the sand becomes loose and can be easily blown away. Sometimes blowouts or weak spots are formed (Florida Department of Community Affairs and 1000 of Friends of Florida, 1995; Earnest and Kuehn, 1994; Barnett and Crewz, 1990). Physical destruction of the dunes may cause accelerated beach erosion by allowing water to penetrate further inland and by reducing the amount of sand that may be deposited on the beach from the receding water. This results in the decrease of available beach habitat for sea turtle nesting.

Experimental dune restoration research on Santa Rosa Island indicates that it takes 4 to 6 years for the dunes to rebuild naturally after a hurricane (Petrick, 2002; Miller *et al.*, 1999). Thus, it is necessary to protect the beach and dune habitat from physical perturbations such as loss of

vegetation. Because the ALRT activities are to be conducted for short periods of time and are not anticipated to be a constant presence on the island, natural restoration of the foredune vegetation should not be hindered.

#### **CUMULATIVE EFFECTS**

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed project are not considered in this opinion because they require separate consultation pursuant to section 7 of the Endangered Species Act. Ongoing mission activities occur within the training area on a one-time or continuing basis. Existing land uses to the east and west of the Action Area on Santa Rosa Island are primarily a combination of Eglin conservation and limited military operations. The northern boundary consists of high density single family residences on the north shore of Santa Rosa Sound. The Gulf of Mexico makes up the southern boundary of the Action Area. The Service is not aware of any cumulative effects in the Action Area. Eglin is currently in the process on preparing a programmatic EA and BA to address all mission activities conducted on Santa Rosa Island.

#### **CONCLUSION**

After reviewing the current status of the loggerhead, green, leatherback, and Kemp's ridley sea turtles, the environmental baseline for the ALRT activities on Santa Rosa Island, Eglin, the effects of the activities, proposed protective, avoidance, and minimization measures, and the cumulative effects, it is the Service's biological opinion that the project, as proposed, is not likely to jeopardize the continued existence of the above listed sea turtle species. No critical habitat has been designated for any of the sea turtles in the continental United States; therefore, none would be affected.

The proposed project would directly and indirectly affect approximately 15.2 acres of sea turtle nesting habitat along approximately ½ mile of Gulf of Mexico surf zone and beachfront. This area accounts for less than 0.01 percent of the approximately 1,400 miles of available sea turtle nesting habitat in the southeastern U.S. It is estimated that on an annual or biennial basis, if the ALRT activities are conducted during the entire sea turtle nesting and hatching season on Test Site A-15, that up to 1.0 loggerhead sea turtle nest, 1.0 adult loggerhead female sea turtle, and 126 loggerhead hatchlings annually; and 1.0 green sea turtle nest, 1.0 adult green female sea turtle, and 136 green hatchlings biennially, would be incidentally taken. No take of leatherback or Kemp's ridley sea turtle nests, adult female, or hatchling sea turtles are anticipated. The loss of sea turtle nests, adult female sea turtles, and hatchling sea turtles will not appreciably reduce the survival and recovery of the loggerhead (1.0 nests out of 68,000 to 90,000 laid annually and up to 126 hatchlings out of 8.4 million annually), and green (1.0 nests out of 500 to 9,000 nests and 136 hatchlings out of 1.2 million biennially) sea turtles in the wild. Furthermore, incorporating measures in the project activities and relocating sea turtle nest out side of the project area is expected to reduce the potential risk of the activities affecting nesting sea turtles, nests, eggs, and hatchlings.

**INCIDENTAL TAKE STATEMENT**

Section 9 of the Endangered Species Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered or threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include major habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to noticeably disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and shall be implemented by Eglin AFB for the exemption in section 7(o)(2) to apply. Eglin AFB has a continuing duty to regulate the activity covered by this incidental take statement. If Eglin AFB (1) fails to assume and assure implementation of the terms and conditions or (2) fails to require the participants in the ALRT activities to adhere to the terms and conditions of the incidental take statement through enforceable terms, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, Eglin AFB shall report the progress of the project and its impacts on the species to the Service as specified in the incidental take statement [50 CFR §402.14(I)(3)].

**Amount or Extent of Take**

The Service has reviewed the biological information and other information relevant to this action. Based on this review, incidental take is anticipated for (1) all sea turtle nests that may be laid and eggs that may be deposited and missed by the day and night nesting surveys within the boundaries of the Action Area of ALRT activities in Test Site A-15; (2) all sea turtle nests deposited during the period when a nest survey program is not required to be in place within the boundaries of the Action Area of ALRT activities in Test Site A-15; (3) harassment in the form of disturbing or interfering with adult female sea turtles approaching the beach, attempting to nest or returning to the sea after nesting within the Action Area of ALRT activities in Test Site A-15 by either structures or people; (4) misorientation or disorientation of hatchling turtles adjacent to the Action Area of Test Site A-15 as they emerge from the nest and crawl to the water; and/or (5) behavior modification of nesting adult female sea turtles due to shoreline configuration changes resulting from the ALRT activities within Test Site A-15 during a nesting season, resulting in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs.

Incidental take is anticipated from the ALRT activities during the sea turtle nesting season for an undetermined amount of years. The Service anticipates incidental take of sea turtles would be difficult to detect for the following reasons: (1) the inability to predict what days of the year the ALRT activities may occur during the sea turtle nesting season, (2) sea turtles nest primarily at night and all nests are not found because of human error, the ALRT activities, and natural factors, such as rainfall, wind, and tides may obscure crawls and result in nests being destroyed because they were missed during a nesting survey; (3) hatchling sea turtles typically emerge from the nest at night and all hatchlings affected may not be found as a result of predation, desiccation or being washed away, or (4) an unknown number of adult female sea turtles may avoid the beach and be forced to nest in a less than optimal area; and (5) behavior modification of nesting females or hatchlings due to noise or presence of project participants on the beach.

Since some of the ALRT activities are expected to take place within the sea turtle nesting season, adverse effects to nesting and hatchling sea turtles within approximately 15.2 acres of nesting habitat at Test Site A-15 of Gulf of Mexico beachfront can be anticipated. The take is more likely during peak nesting and hatching season and could include up to 1 loggerhead sea turtle nest, 1 adult loggerhead female sea turtle, and 126 loggerhead hatchlings annually, and 1 green sea turtle nest, 1 green adult female sea turtle, and 136 green hatchlings biennially. No take of leatherback or Kemp's ridley sea turtle nests, adult female turtles or hatchlings are anticipated.

#### Effect of the Take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to loggerhead or green sea turtles. No take of leatherback or Kemp's ridley sea turtles is anticipated, thus, the proposed action is not likely to result in jeopardy to leatherback or Kemp's ridley sea turtles. Critical habitat has not been designated within the 7-mile Action Area of the ALRT activities; therefore, the project would not result in destruction or adverse modification of critical habitat for loggerhead, green, leatherback, or Kemp's ridley sea turtles.

Incidental take of nesting and hatchling sea turtles and sea turtle nests is anticipated to occur during the ALRT activities for an undetermined number of years. The take would occur on nesting habitat consisting of approximately  $\frac{1}{2}$  mile of beachfront and surf zone. However, measures to reduce potential impacts to nesting females, their nests and eggs, and hatchling have been incorporated into the ALRT activities.

#### Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measures (RPMs) are necessary and appropriate to minimize take of sea turtles as a result of the ALRT activities on the restricted Gulf of Mexico beach, Santa Rosa Island controlled by Eglin.

1. Personnel movement associated with the ALRT activities along the Gulf of Mexico portion of Test Site A-15 are to follow all applicable restrictions to movement along the beachfront as provided verbally, written, or indicated on the ground.

2. If the ALRT project is conducted during the sea turtle nesting season, daily surveys for nesting sea turtles are to be conducted. Any nests laid within Test Site A-15, are to be relocated.
3. Participants in the ALRT activities on Santa Rosa Island are to be informed and cognizant of the potential effects of human presence and the ALRT activities on sea turtles and behave accordingly as instructed.
4. The boundaries of the ALRT activities will be considered as the same as the Test Site A-15 boundaries and are to be clearly delineated either on the ground or provided in a map to all project participants.
5. Eglin is to require the participants of the ALRT to designate an observer to be responsible for identifying signs of sea turtle activity when ALRT activities are to take place at night during the sea turtle nesting season on Santa Rosa Island.
6. Eglin is to ensure that beach and dune habitats impaired by the ALRT activities on Santa Rosa Island, are appropriately restored and maintained with concurrence from the Fish and Wildlife Service.
7. Eglin is to continue to conduct daily sea turtle nesting surveys on all the beaches under their management during the sea turtle nesting season in accordance with State of Florida permits and protocol.
8. Eglin is to ensure that the terms and conditions are accomplished and completed as detailed in this incidental take statement including completion of reporting requirements.

**Terms and Conditions**

In order to be exempt from the prohibitions of section 9 of the Endangered Species Act, Eglin shall comply with the following terms and conditions, which implement the reasonable and prudent measures, described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

**1. Species Protection**

- A. Daily early morning surveys will be required if any portion of the ALRT testing occurs during the period from May 15 through October 31. Nesting surveys will be initiated 70 days prior to ALRT activities or by May 1, whichever is later. Nesting surveys must continue through the end of the activities or through September 1, whichever is earlier. Hatching and emerging success monitoring will involve checking nests beyond the completion date of the daily early morning nesting surveys. If nests are laid in areas where they may be affected by the ALRT project, eggs must be relocated per the following requirements.

1. Nesting surveys and egg relocations will only be conducted by personnel with prior experience and training in nest survey and egg relocation procedures. Surveyors are to have a valid Florida Fish and Wildlife Conservation Commission permit. Nest surveys are to be conducted daily between one-half hour before sunrise and 9 a.m. Surveys are to be performed in such a manner so as to ensure that ALRT activity does not occur in any location prior to completion of the necessary sea turtle protection measures.
  2. All nests within Test Site A-15 will be relocated to adjacent beaches on the east and west sides of the Test Site. The nests must be relocated at least 50 feet away from the boundaries of the Test Site. Nests requiring relocation must be moved no later than 9 a.m. the morning following deposition. Nest relocations in association with the ALRT project must cease when project activities no longer threaten nests.
  3. Nests deposited within areas where ALRT project activities have ceased or will not occur for 70 days must be marked and left *in situ* unless other factors threaten the success of the nest. The turtle permit holder must install an on-beach marker at the nest site and a secondary marker at a point landward as possible to assure that future location of the nest will be possible should the on-beach marker be lost.
- B. During the times when concertina wire will be used seaward of the mine arrays, a fence will be installed to direct nesting sea turtles away from the test area unto adjacent beaches that are devoid of obstacles. The fence must be adequately installed so that sea turtles are unable to become entangled or trapped in the fence or crawl over the fence.
- C. On the nights the ALRT activities will occur during the sea turtle nesting season, Eglin Natural Resources Branch is required to notify and provide location information to the test participants about each nest that is a maximum  $\frac{1}{2}$  mile away from Test Site A-15 and is at or past incubation day 60.
- D. Participants will avoid marked sea turtle nests by at least 50 feet during the ALRT activities.
- E. Between May 15 and November 15, on the nights when the ALRT activities will be conducted, the east and west boundaries of Test Site A-15 are to be clearly posted, marked on the ground, or provided on maps to participants of the project. If all sea turtle nests have hatched or been evaluated up to  $\frac{1}{2}$  mile away, this restriction is not required.
- F. If the boundaries of Test Site A-15 are marked on the ground, Eglin Natural Resources Branch or their designee are to check them daily during the ALRT project. Missing posts or other marking material are to be replaced within 24 hours of discovery. If all sea turtle nests have hatched or been evaluated up to  $\frac{1}{2}$  mile away, this restriction is not required.

- G. Between May 15 and September 1, on the nights that ALRT activities would be conducted, one testing participant is to be designated as an observer to be responsible for identifying signs of nesting or hatchling sea turtles. The observer will be responsible for assuring that the project participants do not interfere with nesting sea turtles, impede hatchling sea turtles from emerging from the nest and crawling to the Gulf of Mexico or obscure signs of sea turtle activity.
- H. If an adult sea turtle is observed on the beach while the ALRT testing is ongoing, participants are to remain as quiet as possible allowing the turtle to continue her activities. All effort will be made not to obscure the turtle crawl or nest area. The morning nesting survey will be responsible for relocating the nest during the following morning survey. If the sea turtle becomes or appears to be disoriented, actions to ameliorate the impacts will be accomplished immediately. The responder will document the event on a stranding data sheet.
- I. If hatchling turtles are observed on the beach without an Eglin Natural Resources Branch observer onsite, all efforts will be made to not disturb the hatchling movement. All efforts will be made not to obscure the turtle crawls or the nest from where they emerged. Following completion of the night ALRT testing, Eglin Natural Resources Branch is to be notified of the occurrence.
- J. Between May 15 and November 15, Eglin is to provide a 24-hour contact to the ALRT test participants that would be available to respond or to handle emergencies related to harm or injury to sea turtles and to answer questions related to endangered species and the testing activities.
- K. If a turtle crawl is seen on the beach during daytime following the daily survey with no associated marked nest, the appropriate Eglin Natural Resources Branch contact, their designee, or the 24-hour contact will be immediately notified. Care is to be taken not to disturb the crawl and/or nest site.
- L. Between May 15 and November 15, all direct lighting of the beach and near shore waters associated with the ALRT activities will be limited to Test Site A-15. If all sea turtle nests have hatched or been evaluated up to  $\frac{1}{2}$  mile, this restriction is not required.
- M. Conditions and restrictions to the ALRT activities will be provided to all participants in verbal and written form.
- N. Eglin is to continue to participate and implement predator control on Santa Rosa Island to ensure predation of sea turtles and their nests is maintained at a rate of less than 5 percent.

**O. Information to Participants of ALRT activities.**

Eglin is to implement an educational overview including a handbook for the participants of the ALRT activities about sea turtles and the significance of the species in the coastal ecosystem and the importance of protecting and contributing to their conservation. The handbook is to include guidance to the test participants on the actions needed if a sea turtle is seen on the beach during ALRT activities. The handbook created for the Marine Expeditionary Unit training operation will serve this purpose.

2. Habitat Protection, Training Impact Evaluation, Restoration, and Maintenance of Habitats
  - A. No equipment or vehicles are allowed on or within dune habitat.
  - B. No ALRT project participants are allowed on the dunes, vegetated or unvegetated, that are 5 feet or higher.
  - C. Within 12 hours following ALRT project activities during the calendar year 2004, Eglin Natural Resources Branch is to conduct an assessment of the impacts to sea turtles and beach and dune habitats. Within 30 days following the assessment, Eglin is to provide the Fish and Wildlife Service (Service) the findings of the assessment, recommendations for habitat restoration and/or changes in future ALRT activities to rectify or minimize the impacts if possible. If impacts are determined to be minimal or non-existent, the assessments can be eliminated after 2004.
  - D. If habitat restoration is needed, it will meet the following requirements. All dune restoration is to be designed and conducted to minimize impacts to sea turtles in accordance with Florida Department of Environmental Protection guidelines below.
    1. A maximum of 10 foot-long spurs of parallel fence spaced a minimum of 7 feet apart will be installed on a northeast-southwest (diagonal) alignment (below schematic).
    2. All fence material will be repositioned as necessary to facilitate dune building and is to be removed when 30 percent of the fence is covered with sand.
    3. Planting of dune vegetation may be implemented during the sea turtle nesting season (between May 15 and November 15) but will incorporate the following conditions:
      - a. Daily early morning nesting surveys will be required during the period from May 15 through September 1. Nest surveys are to be conducted in accordance with Florida Fish and Wildlife Conservation Commission permit requirements. No dune planting activity is to occur until after the daily turtle survey and nest conservation and protection efforts have been completed.

- b. Any nests deposited in the dune planting area not requiring relocation for conservation purposes will not be left *in situ*. An on-beach marker at the nest site and a secondary marker at a point as far landward as possible will be installed to assure that future location of the nest would be possible should the on-beach marker be lost. The nest is to be marked for protection. No planting or other activity is to occur within this area nor would any activity occur which could result in impacts to the nest. Nest sites are to be inspected daily to assure nest markers remain in place and the nest has not been disturbed by the planting activity.
- c. If a nest is disturbed or uncovered during planting activity, all work will cease and Eglin Natural Resources Branch or the 24-hour contact is to be immediately contacted. If a nest(s) cannot be safely avoided during planting, all work within the affected project site will be delayed until hatching and emergence success monitoring of the nest is completed.
- d. All dune planting activities are to be conducted during daylight hours only.
- e. All dune vegetation are to consist of plant species native to the area and be planted in accordance with Florida Department of Environmental Protection guidelines.
- f. No use of heavy equipment (trucks) is allowed on the dunes for the planting activity. A lightweight (ATV type) vehicle, with tire pressures of 10 psi or less may be operated on the beach.
- g. All irrigation systems are to be installed outside of sea turtle nesting season from December 1 and April 30 and removed before May 15 of each year.

E. Informing the ALRT Project Participants about Habitat Protection

- 1. Eglin AFB will ensure that participants in the ALRT program understand the need to protect beach and dune habitat during the test activities.
- 2. Eglin AFB are to ensure that the protection of habitat will be implemented by the marking of the habitat boundary, posting no entry areas, and/or providing verbal and written communication to the participants of the ALRT project.

3. Species Monitoring

- A. Eglin AFB is to continue implementing their sea turtle nesting survey program on all beaches under their management in accordance with Florida Fish and Wildlife Conservation Commission (FWC) permit requirements.

1. Daily early morning sea turtle nest surveys are to be conducted between May 15 and September 1. Frequency of hatching and emerging success monitoring after September 1, is to involve checking nests based on expected nest hatched dates.
  2. Nest surveys will only be conducted by personnel with experience and training in nest survey procedures. Surveyors are to have a valid FWC permit. Nest surveys will be conducted daily between half hour before sunrise and 9 a.m. Data gathered during the survey will be in the form required by the FWC permit. The survey is to include geographic position data collection and the data is to be incorporated into Eglin's geographic information system.
  3. All nests deposited on Santa Rosa Island are to be marked and left *in situ* unless relocation is in compliance with FWC guidelines (except for those in the Action Area and nest relocations required under other Service biological opinions). All sea turtle nests are to be marked. The nest marking may be in the form of a predator-proof cage or other marking in accordance with Eglin's FWC permit and guidelines and conspicuous to participants of the training exercise. Once a nest is marked or it is determined that there is no nest and it is a false crawl, the crawl will be obliterated so that it is obvious that the site has been checked.
  4. Nest sites are to be inspected daily to assure nest markers remain in place and the nest has not been disturbed.
- B. Eglin is to continue to participate in the State of Florida's Sea Turtle Stranding and Salvage Network. All strandings are to include geographic position data collection and the data is to be incorporated into Eglin's geographic information system.
4. Reporting
    - A. All Eglin military and civilian personnel involved in any aspect of the ALRT activities and events on Santa Rosa Island are to be notified that upon locating a sea turtle adult, hatchling, or egg that has been harmed or destroyed, contact will be made with the Eglin Natural Resources Branch. Eglin Natural Resources Branch, their designee, or the 24-hour contact is to be responsible for notifying the Florida Fish and Wildlife Conservation Commission Stranding and Salvage Network by Pager: 1-800-241-4653, ID#274-4867; and the U.S. Fish and Wildlife Service Office located in Panama City, Florida at (850) 769-0552. Care is to be taken in handling injured turtles or eggs to ensure effective treatment or disposition, and in handling dead specimens to preserve biological materials in the best possible state for later analysis.
    - B. A report describing the actions taken to implement the terms and conditions of this incidental take statement is to be submitted to the Project Leader, U.S. Fish and Wildlife Service, 1601 Balboa Avenue, Panama City, Florida, 32405, within 60 days of the end of the calendar year for each calendar year in which the ALRT activities are conducted. This report are to include the dates of the test activities, assessment and

plan of action to address impacts to sea turtle and their habitats within Test Site A-15 on Santa Rosa Island, and hatching and emerging success of nests. If the ALRT project does not take place, a negative report is still required, with sea turtle nesting survey data for the year. Only if the ALRT activities on Santa Rosa Island are permanently stopped will the above conditions not be required.

### **CONSERVATION RECOMMENDATIONS**

Section 7(a)(1) of the Endangered Species Act (Act) directs federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

#### **ALRT Activities**

Eglin should work with the participants in scheduling the ALRT activities to avoid the peak weeks in June and July of sea turtle nesting and the peak weeks in August and September of sea turtle nest hatching on Santa Rosa Island to further reduce potential impacts to sea turtles.

#### **Santa Rosa Island - Mission, INRMP, and Recreational Use**

1. Complete the Beach Management Component of the INRMP (deadline date from INRMP biological opinion - February 1, 2003).
2. Initiate Programmatic section 7 consultation for mission activities on Eglin managed lands, Santa Rosa Island.

#### **Species & Ecosystem Specific**

##### Piping Plover

1. Continue habitat protection for piping plover.
2. Continue participating in the International Piping Plover Census. Initiate monitoring of piping plover bi-monthly in accordance with provided survey guidance.
3. Provide the Fish and Wildlife Service, Panama City, Florida Field Office with annual results of the piping plover surveys including negative survey data.

##### Shorebirds

1. Continue habitat protection and monitoring of the snowy plover so that federal protection of the species is not required in the future.

2. Continue protection of shorebird nesting habitat between the Beach Club and the Destin Pass jetties that has been closed to the public to protect nesting shorebirds. The area is delineated by perimeter signs and consists of about 46 acres. Signs have been installed in these areas.

Santa Rosa Beach Mouse

1. Continue habitat protection, predator control, and track survey monitoring of the Santa Rosa beach mouse so that federal protection of the subspecies is not required in the future.
2. Continue protection of Santa Rosa beach mouse habitat from pedestrian traffic in the two areas south of U.S. Highway 98 by maintaining the installed sand fence. One area is located between the Okaloosa County Beasley Park and the parking lot of the old Airman's Club and covers about 31 acres. The second area is between Princess Beach and the Beach Club and consists of about 26 acres. Signs have been prepared, purchased, and installed by Eglin that read "Keep Out Endangered Species."

Barrier Island Ecosystem

1. Construct dune walkovers and parking areas where appropriate to protect dune habitats at beach access points on the portion of Santa Rosa Island open to the public.
2. Continue dune restoration and protection as needed.
3. Place informational signs about barrier islands and the species the ecosystem supports at beach access points where appropriate to increase public awareness. The signs should describe the importance of the beach and dunes to conservation of the species and protection of inland habitats.
4. Implement the following procedures when driving on the beach (except in emergency situations) to minimize impacts to barrier island habitats.
  - a. If feasible, drive vehicles on the beach that have tire pressures equal to or less than 10 psi.
  - b. Do not drive vehicles on or across the dunes.
  - c. Between May 15 and November 15, all driving along the beach shoreline should be seaward of the wrack or debris line (previous high tide) or just above it during high tide conditions.
  - d. From November 15 through April 30, all driving along the beach shoreline should be just landward of the wrack or debris line (previous high tide).

Marine Mammals

Continue to participate in the marine mammal stranding network.

Florida Perforate Lichen

1. Minimize impacts to the Florida perforate lichen by incorporating the following into the Beach Management Component that would be developed:
  - A. Habitat Protection, Restoration, and Maintenance
    1. Continue to maintain the exclusion areas, beach access points, and designated foot trails on the public use portion of Santa Rosa Island to protect habitats of Florida perforate lichen.
    2. Consider other habitat protection measures for the Florida perforate lichen to assure the best protection is being implemented on the north and south sides of U.S. highway 98. Conservation measures should include but are not limited to the following:
      - a. install boardwalks where fence installation is not feasible,
      - b. create additional parking at un-used facility sites (such as at Site A-2),
      - c. coordinate and work with Florida Department of Transportation to provide signs to clearly identify parking sites,
      - d. implement appropriate measures to assure funneling of beach goers to beach access points and foot trails (additional fence and wing wall installation),
      - e. partner with the local community to provide and manage parking, beach access, trash pick up, and enforcement of habitat protection.
    3. Ensure dedicated enforcement of Florida perforate lichen protection is in place and implemented especially during periods of high public use such as spring break, holidays, and weekends during the summer season. Enforcement would include the proper use of beach accesses and foot trails and adherence to the exclusion areas by beach goers.
    4. Design all dune restoration and vegetation planting to minimize impacts to occupied and suitable but unoccupied habitat of the lichen.
  - B. Ensure Eglin personnel and their contractors abide by the Okaloosa County ordinance that prohibits the use of clay or fill material on Santa Rosa Island to control the invasion of exotic plants and unsuitable material into the habitat of the lichen.

- C. Continue to participate and implement predator control on Santa Rosa Island to ensure that excessive trampling of the Florida perforate lichen by wildlife does not occur.
- D. Enforce prohibitions regarding malicious destruction or possession without a permit of Florida perforate lichen by notifying all Eglin military and civilian personnel that upon documenting an incident, contact should be made with the Eglin Branch of Natural Resources and the U.S. Fish and Wildlife Service Office located in Panama City, Florida at (850) 769-0552.
- E. Florida Perforate Lichen Monitoring and Research
  - 1. Consider the funding and/or logistical support of genetic research of the lichen.
  - 2. Accomplish a survey to ascertain the occupied and suitable but unoccupied habitat of the lichen on Santa Rosa Island, so that potential impacts to the species can be minimized. The survey should include geographic position data collection and incorporation of the data into Eglin's geographic information system.
  - 3. Implement a monitoring program on Santa Rosa Island, so that the status of the lichen's populations can be monitored. This monitoring should include the newly re-introduced populations as well as the population on Site A-2 north of US Highway 98.
  - 4. Implement monitoring of the re-introduced lichen populations on the restricted beach in accordance with the researcher's guidelines to assure that accurate and statistically meaningful data is collected to assess population changes.
  - 5. Provide copies of any annual or final survey reports to the Fish and Wildlife Service on the lichen on the public use portion and the re-introduced population on the restricted portion of Santa Rosa Island.

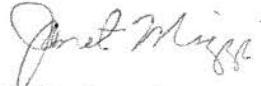
**REINITIATION/CLOSING NOTICE**

This concludes formal consultation on the action outlined in this biological opinion. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion, or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take should cease pending reinitiation.

An annual report would be submitted to the Service that identifies the protective, avoidance, and minimization measures that were employed and the actions taken to implement the terms and conditions for the ALRT project. This report should include the dates and timing of activities, an assessment of the effectiveness of the conservation measures and terms and conditions, and a plan of action to address impacts to habitats resulting from the activities. The annual report would be submitted no later than March 1 of each year. Failure to implement the conservation measures, terms and conditions, or failure to provide an annual report, would result in reinitiation of consultation.

The above findings and recommendations constitute the report of the Department of the Interior. This concludes formal consultation on the ALRT activities at Test Site A-15, Santa Rosa Island, Eglin Air Force Base. If you have any questions about this opinion, please contact Lorna Patrick of this office at extension 229.

Sincerely yours,

  
Gail A. Carmody  
Project Leader

cc:

Sandy MacPherson, FWS, Jacksonville, FL  
Robin Trindell, FWC, Tallahassee, FL  
Karen Lamonte, FWC, Panama City, FL  
Joe Johnston, FWS, Atlanta, GA (electronic copy)

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**APPENDIX B-2. AMENDMENT TO BIOLOGICAL ASSESSMENT AND  
BIOLOGICAL OPINION**

DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS 96TH AIR BASE WING (AFMC)  
EGLIN AIR FORCE BASE FLORIDA

Mr. Stephen M. Seiber  
Chief, Natural Resources Section  
96 CEG/CEVSN  
501 De Leon Street, Suite 101  
Eglin AFB FL 32542-5133

20 SEP 2007

Ms. Janet Mizzi  
U.S. Fish and Wildlife Service  
1601 Balboa Avenue  
Panama City FL 32405

Dear Ms. Mizzi:

The following information is being submitted as an amendment to Section 7 consultation under the Endangered Species Act (ESA) for the Advanced Littoral Reconnaissance Technologies (ALRT) project Formal Biological Assessment (FWS 4-P-04-225). The Biological Assessment (BA) was submitted on February 3, 2004 for the potential impacts to nesting loggerhead, green, and leatherback sea turtles; Gulf sturgeon and Gulf sturgeon critical habitat; wintering piping plover and piping plover critical habitat; and Florida perforate lichen associated with ALRT testing activities on Santa Rosa Island (SRI), Eglin Air Force Base (AFB), Florida. The amount and extent of take was identified in the ALRT Biological Opinion dated June 4, 2004.

At USFWS request, Eglin AFB is submitting this amendment regarding the modifications to ALRT testing. The Navy proponent requested these modifications to the mission to test real-world threats in the surf zone and beach areas. The modifications primarily involved placing objects in the surf zone and will require a formal Section 7 consultation with the National Marine Fisheries Service (NMFS) due to potential impacts to sea turtles, Gulf sturgeon, Gulf sturgeon critical habitat, and essential fish habitat. Eglin Natural Resources Section (NRS) and USFWS personnel agreed in discussions that the land-based changes to the ALRT mission did not warrant a new formal Section 7 consultation for potential impacts to sea turtles from: modifications to the ALRT missions described in this letter associated with beach activities; amount and extent of take under the ALRT Biological Opinion dated June 4, 2004; the potential for increased impacts to listed species; and implementation of the terms and conditions of the ALRT Biological Opinion. The incidental take statement in the ALRT Biological Opinion allowed take for the ALRT project area (15.2 acres of nesting habitat). As a result of this modification to the ALRT mission, Eglin NRS believes that ALRT mission activities are **likely to adversely affect** nesting loggerhead and green sea turtles. ALRT testing activities are **not likely to adversely affect** wintering piping plover, **not likely to adversely modify** piping plover critical habitat and have **no effect** on the Florida perforate lichen.

**Proposed Action**

The Proposed Action would involve the collection of both passive and active multispectral seeker/sensor signature data of obstacles, simulated mines and barricades in inland environments, and littoral waters from several possible systems and airframes (Figures 1-4). In this document obstacles are defined as objects placed in the water or on the beach that still allow marine species complete access to and from the shore. These items can be (but not limited to) PDM-1 and PDM-2 inert mines (Figures 5-7), structural hedgehogs (Figure 8), tetrahedrons, and concrete cubes. Barricades are items that would interfere with access to and from the beach. These items typically are 15 – 31 meters (m) (50 – 100 feet [ft]) long sections no greater than 100 meters in length and can be (but not limited to) concertina wire (Figure 9), tanglefoot (Figure 10), and structural sea urchins (obstacles placed close together that act as a barricade) (Figure 11).

**System and Flight Descriptions**

During each one- to two-week testing series, multiple data collection flights would occur, typically with two flights per day. The aircraft, a Bell UH-1 "Huey", the standard airframe for this test, would fly to Test Area A-15 to collect data. Then, the aircraft would land on Test Area A-15 to refuel, download data, check systems, and tie down for the night as required. The Test Area A-15 Fire Department would support all helicopter landing, stationing, and refueling operations. The HLZ would be marked and static line equipped. The helicopter would take off from Test Area A-15 for subsequent data collection flight, then return to the mainland or stay on Test Area A-15 at mission completion. Flights would occur during day and night hours, with approximately 25 percent of missions occurring at night between the hours of 2100 and midnight. Altitudes would range from 152 to 914 m (500 to 3,000 ft) for each sortie, with speeds from 35 to 70 knots (40 to 81 miles per hour) typically. Aircrew would fly clover leaf, racetrack, and/or parallel tracks as needed to optimize data collection. Other aircraft such as small fixed-winged planes may also be used for future missions—these planes would not refuel at Test Area A-15. Missions that do not require landing at Test Area A-15 would stage out of local airports.

The typical system would consist of the imaging sensor, optical illuminator image recording hardware, navigation tracking software, mechanical cooling equipment for the illuminator, and the aircraft. Lasers are enclosed in a light-tight enclosure with a mechanical shutter for stopping illumination when not over target fields. In addition, a number of laser safety devices are incorporated into the system to prevent inadvertent laser operation. Cameras would record images of the target field. All recording is annotated electronically and synchronized together with Global Positioning System (GPS) time.

Airborne Laser Diode Array Illuminator - Wide (ALDAI-W) and Rapid Overt Airborne Reconnaissance (ROAR) laser parameters and hazard levels are included in Tables 1 through 4.

**Table 1. ALDAI-W Laser Parameters**

Item	Value
Wavelength	808 nm
Power	0.47 Joules/Pulse
Pulse Width	200 $\mu$ s
Pulse Repetition Frequency	30 Hz
Beam Diameter in Horizontal Direction	3.0 cm (1.18 in) (half power point)
Beam Diameter in Vertical Direction	4.5 cm (1.77 in) (half power point)
Beam Divergence in Horizontal Direction	0.2985 radians (half power point)
Beam Divergence in Vertical Direction	0.1152 radians (half power point)
Gains of Aided Device	49 (Standard Binoculars)
Attenuation Coefficient (u)	$5.0 \times 10^{-7} \text{ cm}^{-1}$ (Very Clear Day)

ALDAI-W=Airborne Laser Diode Array Illuminator – Wide; nm=nanometer; cm=centimeter; u=Attenuation coefficient;  $\mu$ s=microsecond

**Table 2. ALDAI-W Laser Hazards**

Item	Value
Optical Density of Eyewear (unaided)	4.76 @ 808 nm
Optical Density of Eyewear (aided)	6.46 @ 808 nm
NOHD (unaided, u=0)	47.8 m (156.8 ft)
NOHD (aided, u=0)	335 m (1,099.1 ft)
HD (skin hazard)	0.08 m (3.15 inches)

ALDAI-W=Airborne Laser Diode Array Illuminator – Wide; nm=nanometer; m=meters; u=Attenuation coefficient; HD= Hazard Distance; NOHD=Nominal Ocular Hazard Distance

**Table 3. ROAR Laser Parameters**

Item	Land Value			Marine Value		
	523	690	790	523	250	523
Wavelength (nm)	523	690	790	523	250	523
Power (mJoules/pulse)	500	150	150		250	
Pulse Width (ns)		3.5			3.5	
Pulse Repetition Frequency (Hz)		16.67			16.67	
Beam Diameter in X Direction (mm)		25			25	
Beam Diameter in Y Direction (mm)		25			25	
Beam Divergence in X Direction (mradians)		45		45		15
Beam Divergence in Y Direction (mradians)		45		45		15

ROAR=Rapid Overt Airborne Reconnaissance; nm=nanometer; Hz=Hertz; mm=millimeter

**Table 4. ROAR Laser Hazards**

Item	Land Value			Marine Value	
	523 nm	690 nm	790 nm	523 nm	
	45 mradians			15 mradians	45 mradians
Optical Density of Eyewear (unaided)	2.64	2.11	1.93	2.81	2.81
NOHD (unaided, u=0) (m)	272	149	187	217	644
HD (skin hazard) (m)	1.30	0.60	0.30	1.70	5.00

nm=nanometers; NOHD= Nominal Ocular Hazard Distance; u = Attenuation coefficient; m=meter; HD = Hazard Distance

Personnel would follow general precautions and procedures during system testing. All personnel that potentially could be exposed to the laser would be required to wear safety goggles. As for laser radiation received on the ground, the ALDAI-W is eye-safe at approximately 46 m (150 ft); the planned minimum altitude of 152 m (500 ft) is well above the eye-safe level. Thus, animals and unaided personnel on the ground would be safe from stray laser radiation. However, if any personnel were to view the ALDAI-W radiation with optical aids (such as binoculars), they would be well within the Nominal Ocular Hazard Distance (NOHD) of the ALDAI-W.

The ROAR laser as used on land is eye-safe at 271.5 m (890.5 ft), with a planned mission minimum altitude of 310 m (1,016.8 ft). For ROAR laser use over the marine environment, the eye-safe distance is 643.74 m (2,112.3 ft) (Table 4).

To minimize the risk of injury to stray ground personnel, the lasers would only actively radiate approximately 50 m before the target array in the water, remain active over the target fields and remain active slightly past it into the water (this would create a buffer zone of approximately 100 m [328 ft] before and after the target fields). Ground personnel would clear the test area before granting permission to actively fire the laser. Personnel would have high-powered flashlights for proper safety control of the area. Ground and marine spotters would be present to support beach, sound, highway and Gulf range clearance. The Air Force would issue Notice to Airmen (NOTAM) and Notice to Mariners (NOTMAR). All personnel would wear laser goggles.

The aircrew engineer and pilot would have communication with ground operations and Eglin AFB at all times. Any test personnel could call for a laser shutdown, and the pilot and backseat engineer both would each have access to a master shutdown switch. The aircrew engineer would only operate the laser while crossing areas within or immediately adjacent to the target areas. A dual mode indicator validates laser operation.

#### **Target Field**

Test Area A-15 would provide an ideal background for obtaining imagery over sandy coastal terrain approximating a real threat scenario. In keeping with the program requirement to detect minefields in the littoral zone, the ALRT team would utilize three areas of Test Area A-15: the Gulf coast beach area, the sound, and an intermediate area between the two coastal areas (Figure 2). Targets would also be placed in the waters of the Gulf (in particular the surf zone area) and Santa Rosa Sound (out to 4 m [13 ft] depths).

#### **Test Duration**

Each test series would last one to two weeks. Personnel would set up the target field over three to four days, the mission flights would commence, and then personnel would remove the targets from the test site over two to three days. ALRT missions could occur every few months; the current estimate is four to five times per year.

A typical mission scenario would be described as:

- Three to four days – target set up and mission preparation;
- Four to six days – conduct mission flights;
- Two to four days – weather backup;
- Two to three days – target removal and clean up.

NOTMAR would be broadcast to the general public during and after set up. Either reflective or lighted buoys would be placed approximately 50 m [164 ft] away from the perimeter of the array notifying boats of restricted access to area. During the test mission a Naval/Air Force boat would be present in the water to intercept and warn other boats approaching the test area. There have been no reported boat incursions during previous tests.

#### ***Minefield, Barrier, and Obstacle Layouts***

Activities associated with testing include placement of inert mines and obstacles (such as concrete blocks and concertina wire) on the beach front. M20 anti-tank mines, PDM-1M anti-tank/anti-landing craft mines, or other similar mines that are approximately 14 inches in diameter plus base plate accessories as required, would be used in the surf zone at 0.5-m (1.64-ft) depths.

The minefield, barrier, and obstacle layouts required for this test include linear patterned and random scattered mines, barriers, and obstacles on the beach and in the water. Figure 3 illustrates the proposed primary minefield, barrier, and obstacle layout. Figure 4 represents a secondary minefield, barrier, and obstacle layout. Personnel would place inert mines in each area to simulate actual mine layouts in accordance with current available doctrine. To minimize the movement or loss of mines, each individual target would be anchored, tied together, inventoried, and monitored for proper set up. These devices would be positioned near the edge of the water or in the water up to 4 m (13 ft) deep and anchored primarily with screw anchors or occasionally poles jetted into the sand. To raise and lower some of the heavier targets, a boat/barge with equipment would be necessary. A scuba diver would then secure each mine with a screw anchor.

Mine positions would be recorded using a hand-held differential GPS system at the time of installation in the target field. Personnel would record this “truth data” on the minefield layout chart and use it to score the actual data results to determine horizontal location accuracy. For reference, areas of Test Site A-15 to be flown over would be marked on the perimeter with 1.22 m<sup>2</sup> (4 ft<sup>2</sup>) painted aluminum panels and/or small lights (pointed up). These panels and lights would remain in place throughout the flight series. For night operations, strobe lights would be set up to direct the flight paths.

The inert mines would include M20 inert anti-tank, PDM-1M inert anti-landing craft, and PDM-2 inert anti-landing mines (Figures 5-7). These mine targets are representative of the different materials and types of anti-tank mines encountered in littoral scenarios and are readily available from the current Navy project inventory. They would also

provide a representative sampling of the sizes and spectral signatures encountered in real-world scenarios. Obstacles would include floats and buoys, scientific instrumentation, tetrahedrons, structural hedgehogs (Figure 8), and concrete cubes  $1.22 \text{ m}^3$  ( $4 \text{ ft}^3$ ). Barricades would include concertina wire or wire rolls that could simulate concertina wire (Figure 9), tanglefoot barbed wire fencing (Figure 10), and structural sea urchins, which are three pieces of steel rebar welded in a conical shape (Figure 11). These targets would be placed on the beach and in the surf zone. The obstacles and barricades would not be longer than 100 m (328 ft); however, M20 inert anti-tank mines may be scattered around the other items but would be located within the potential placement locations (Figure 2). Similar barricades or obstacles may be used both in the surf zone and on the beach. The entire area would never be totally filled, only various small sections of the total area would have typical minefield layouts at any given time. There would not be more items emplaced than current inventory allotments allow. Those inventories consist of up to 1000 mine-like objects varying in size from a few inches up to 36 inches in diameter and other targets such as buoys varying in size up to 36 inches, marker panels typically  $4 \text{ ft}^2$ , various wire obstacles, various light to medium anti-landing obstacles, and various instrumentation for monitoring the environment. After the objects are put into place, positional surveys are conducted. For in-water objects, a hand-held GPS would be used to locate the objects by either walking into the water or using a boat to float out. Also, divers would verify the targets daily to confirm their location and clean them off. During these daily checks, divers would survey the area for protected marine species in the area.

Approved items from previous consultation:

- M20 inert anti-tank mines (on beach)
- PDM-1M inert mines (in water)
- Concertina wire (on beach)
- Concrete blocks (on beach)

Additional items on the beach (Figures 3 and 4):

- A tanglefoot barbed wire array placed on the beach, 10 m (32.8 ft) from the water edge and 100 m (328 ft) long.
- An additional row of  $1 \text{ m}^3$  ( $3.3 \text{ ft}^3$ ) structural hedgehogs 30 m (98.4 ft) from the water edge with 10 m (32.8 ft) spacing.
- Structural sea urchins (2 m [6.6 ft] tall) 15 m (49.2 ft) from the water edge and 100 m (328 ft) long.

Additional items in the water (Figure 3):

- Floats and lights to mark the boundary of the test field area and floats throughout the target field area to serve as additional targets.
- Water quality measurement instrumentation positioned on a tall screw anchor (four total). These devices would be positioned around the edge of the target field

and would be anchored to screw anchors or to poles jetted into the sand in up to 3 m (9.8 ft) deep water.

- A trailer on the beach to capture data from water clarity collection devices.
- Type 2 inert anti-landing craft mines at 2- to 3-m (6.6- to 9.8-ft) depths and 15 m (49.2 ft) apart.
- Structural hedgehogs (1 m<sup>3</sup> [3.3 ft<sup>3</sup>]) in approximately 1.3-m (4.3-ft) depths with 10 m (32.8 ft) spacing.
- Structural sea urchins (2 m [6.6 ft] tall) in 0.9-m (2.95-ft) depths and 100 m (328 ft) long.
- Concertina wire or wire rolls manufactured to simulate concertina wire in .3 m (1 ft) of water and 100 m (328 ft) long.
- Additional anti-landing craft mines in the water, in particular at 0.6-m (2-ft), 1.1-m (3.6-ft), and 2-m (6.5-ft) depths at 6 to 10 m (19.7 to 32.8 ft) apart.

The array would remain in place at night, with reflective buoys marking the area to keep boat traffic out. As soon as the last flight test is complete, personnel would remove all of the mines, obstacles, and barricades and account for their locations.

#### **Management Actions**

To minimize impacts to sea turtles and other sensitive SRI species, the management actions below would be required as part of the proposed action. Many of these requirements are Terms and Conditions from the ALRT Testing Biological Opinion (June 4, 2004). Sea turtle season at Eglin AFB is 1 May to 31 October.

- If any portion of the ALRT testing would occur during the period from 1 May through 31 October, the Natural Resources Section (NRS) would conduct daily early morning sea turtle surveys. Nesting surveys at Test Area A-15 would begin 7 days prior to ALRT activities, or by 1 May, whichever is later. Nesting surveys would continue through the end of the activities or through 1 September, whichever is earlier. After this period, the NRS would continue to check nests based on anticipated hatching dates.
- The NRS would relocate all sea turtle nests in the Test Area A-15 area to adjacent beaches at least 15 m (50 ft) from the boundaries of the test site, in accordance with the terms and conditions of the previous biological assessment. All nests will be re-located between Index Nesting Beach Survey marker 3.5 and 5.0 if testing is conducted during the nesting season. Nest relocations associated with the ALRT project would cease when project activities no longer threatened nests.
- During sea turtle season, personnel would install a fence (e.g. silt fence or snow fence) to direct sea turtles away from the common and simulated concertina wire, structural sea urchins, and tanglefoot wire on the beach on to adjacent beaches. This silt fence would serve to minimize but not eliminate potential take to nesting sea turtles.

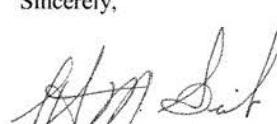
- On the nights that ALRT activities would be conducted, the NRS would provide location information to test participants concerning each sea turtle nest within 0.8 km (0.5 miles) of Test Area A-15 that was at or past incubation day 60.
- Participants would avoid marked sea turtle nests by at least 15 m (50 ft).
- During ALRT activities, Eglin NRS would mark the east and west boundaries of the ALRT mission area. The ALRT mission area would be clearly posted, marked on the ground, or provided on maps to participants.
- On the nights that ALRT activities would be conducted, one testing participant would serve as an observer to be responsible for identifying signs of nesting or hatchling sea turtles. The observer would be responsible for assuring that the project participants did not interfere with nesting sea turtles, impede hatchling sea turtles from emerging from the nest and crawling to the Gulf of Mexico, or obscure signs of sea turtle activity.
- If an adult or hatchling sea turtle was observed on the beach while the ALRT testing was ongoing, testing would stop until the turtle left the beach. Participants would remain as quiet as possible allowing the turtle to continue activities. All effort would be made not to obscure the turtle crawl or nest area.
- Between 1 May and 31 October, Eglin would provide test participants a 24-hour contact that would be available to respond to emergencies related to harm or injury to sea turtles and to answer questions related to endangered species and the testing activities. Point of contact would be Bob Miller, 1-888-328-7351, or Bruce Hagedorn, 1-888-879-5420.
- Between 1 May and 15 November, all direct lighting of the beach and nearshore waters associated with the ALRT activities would be limited to Test Area A-15. If all sea turtle nests have hatched or been evaluated within 0.8 km (0.5 mile), this restriction would not be required.
- Between 1 May and 31 October all set up and take down activity associated with ALRT testing on the beach and in the surf zone would occur during daytime hours and after the morning sea turtle survey is completed.
- Participants would receive conditions and restrictions to the ALRT activities.
- Eglin NRS would present a briefing to the ALRT participants regarding the terms and conditions for the project.
- No equipment or vehicle use would occur on or within vegetated dune habitat that is 1.5 m (5 ft) tall or taller.
- No project participants would traverse dunes, vegetated or unvegetated, that are 1.5 m (5 ft) tall or taller.
- If habitat restoration is necessary, it would be designed and conducted to minimize impacts to sea turtles in accordance with FDEP guidelines detailed in the ALRT Biological Opinion Terms and Conditions.

Potential impacts to sea turtles would be associated with ALRT mines, obstacles, and barricades as well as from ground personnel activities on the beach during nesting and hatching season. Eglin NRS has determined that the proposed ALRT testing activities are **likely to adversely affect** loggerhead and green sea turtles. The proposed ALRT testing activities are **not likely to adversely affect** wintering piping plover, **not likely to adversely modify** piping plover critical habitat and have **no effect** on the Florida perforate lichen. The amount or extent of take is not anticipated to increase with the modifications to ALRT testing. The incidental take statement allows for take within the project area, Eglin NRS believes this amendment would be sufficient for Section 7 ESA compliance provided all ALRT testing activities follow the Terms and Conditions set forth in the Biological Opinion on June 4, 2004 (see attachment).

Eglin AFB would notify the USFWS immediately if it modifies any of the actions considered in this proposed action or if additional information on listed species becomes available, as the USFWS may require a reinitiation of consultation. If impact to listed species occurs beyond what Eglin has considered in the assessment, all operations would cease and Eglin would notify the USFWS. Prior to commencement of activities, Eglin would implement any modifications or conditions resulting from consultation with the USFWS. Eglin NRS believes this fulfills all requirements of the ESA, and no further action is necessary. Eglin NRS will copy the USFWS on the Section 7 consultation documentation and coordination with the NMFS.

If you have any questions regarding this letter or any of the proposed activities, please do not hesitate to contact either Mr. Bob Miller (850) 883-1153 or myself at (850) 882-8391.

Sincerely,

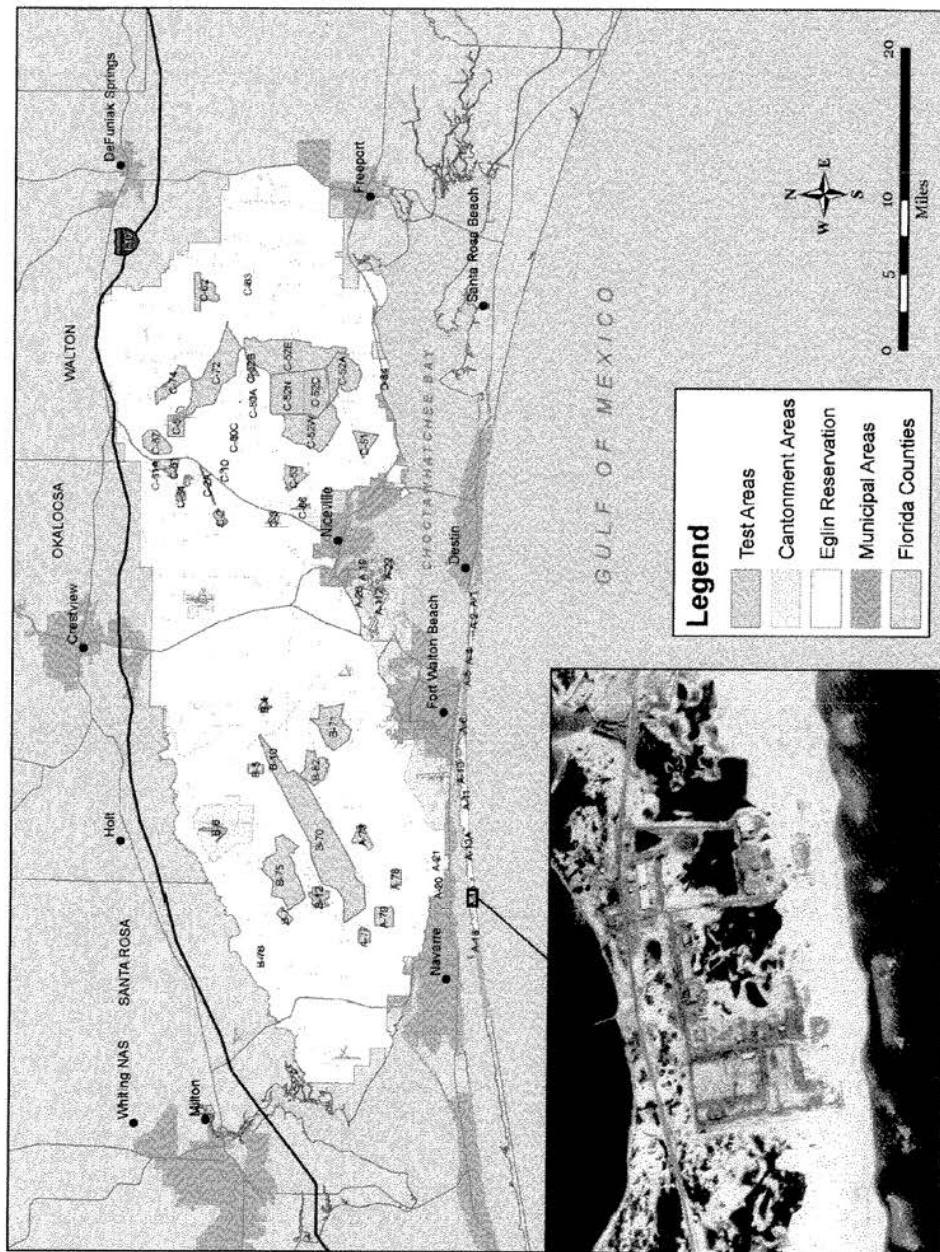


STEPHEN M. SEIBER, YF-2  
Chief, Natural Resources Section

Attachments:  
Figures 1-10  
Airborne Littoral Reconnaissance Technologies Testing Biological Opinion

## Appendix B

## *ESA Section 7 Consultation with USFWS (Biological Assessment and Biological Opinion)*



**Figure 1. Test Area A-15 on Santa Rosa Island, Eglin AFB**

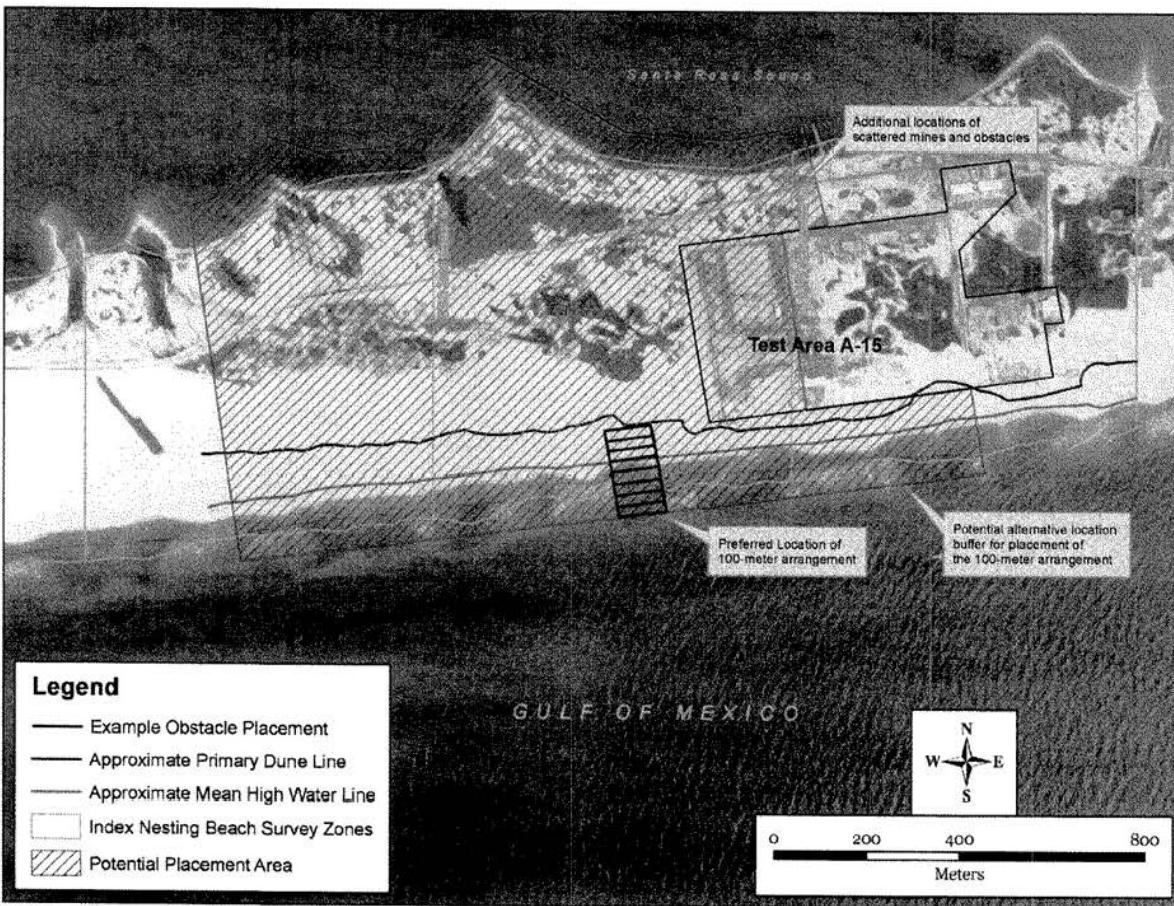
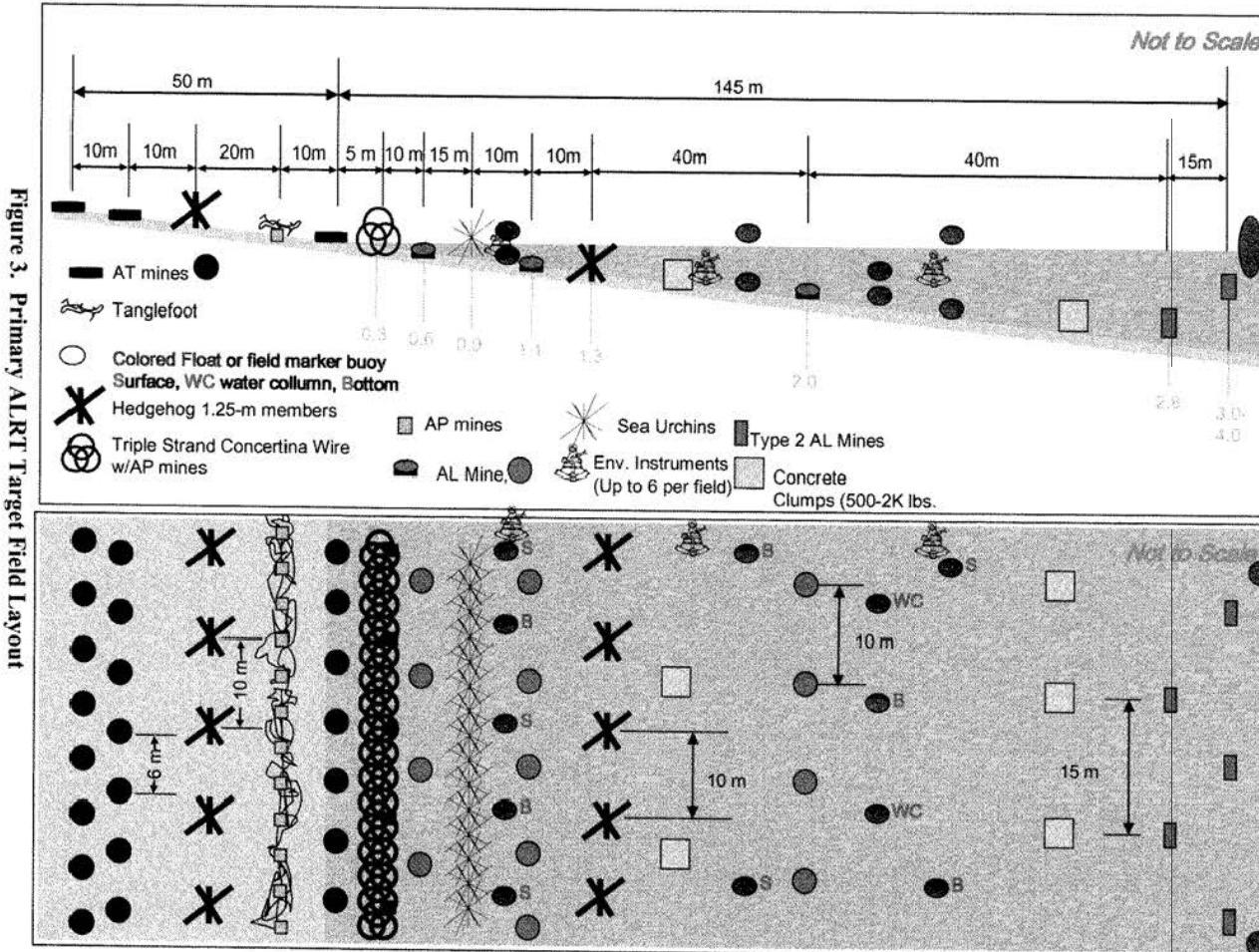


Figure 2. ALRT Target Areas at Test Area A-15



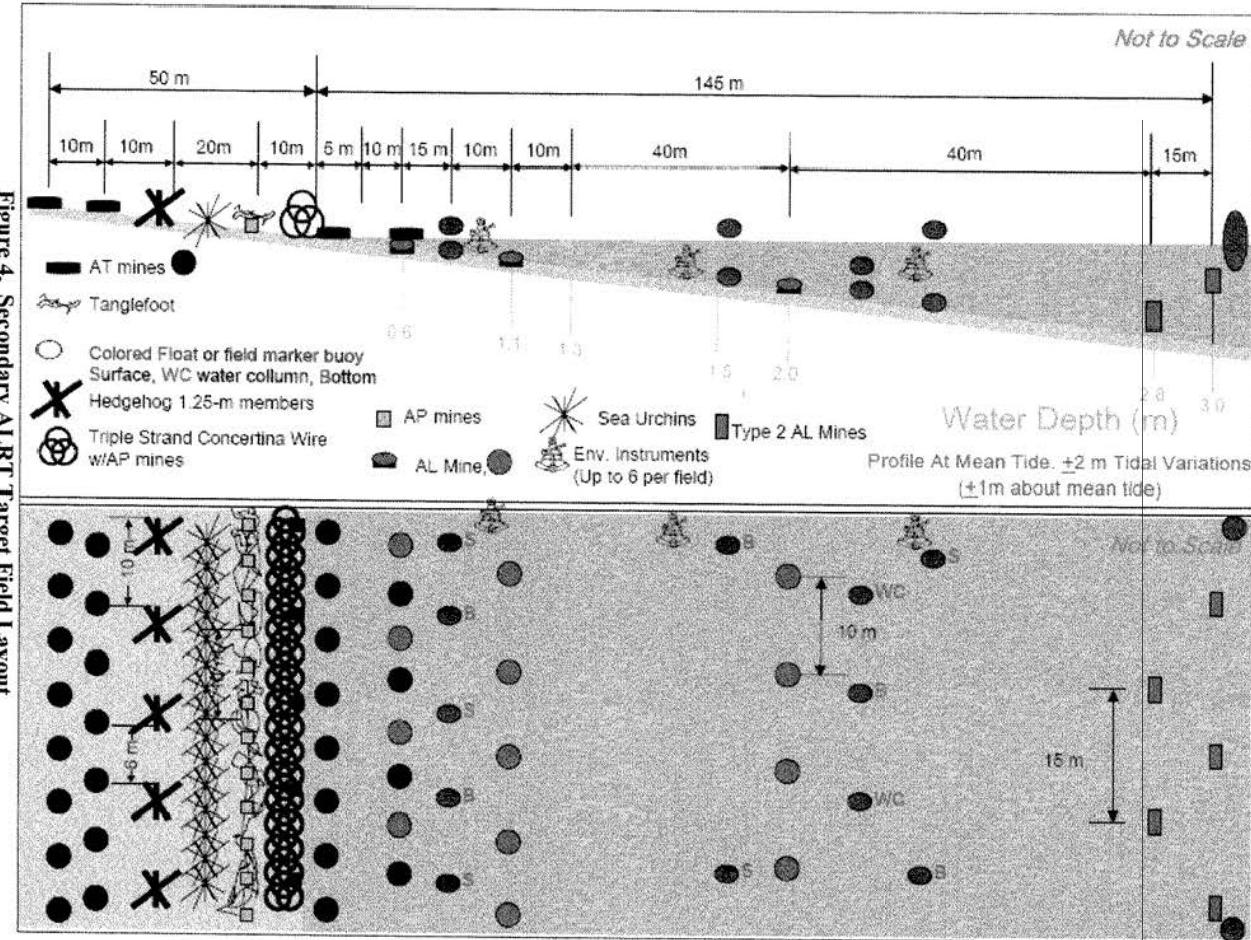
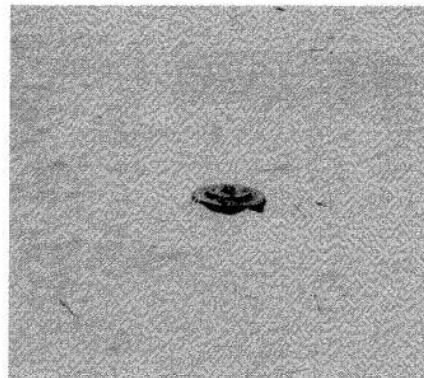


Figure 4. Secondary ALRT Target Field Layout



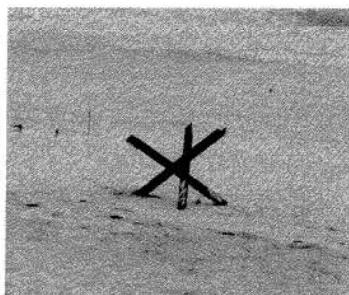
**Figure 5. M20 Inert Anti-Tank Mines**



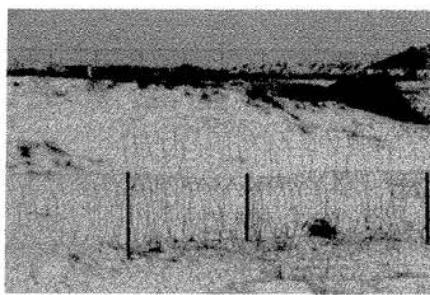
**Figure 6. PDM-1M Anti-Landing Craft Mines**



**Figure 7. PDM-2M Inert Mine**



**Figure 8. Structural Hedgehogs**



**Figure 9. Concertina Wire**



**Figure 10. Tanglefoot**



**Figure 11. Structural Sea Urchins wrapped in snow fencing**



IN REPLY REFER TO:

## United States Department of the Interior

## FISH AND WILDLIFE SERVICE

Field Office  
1601 Balboa Avenue  
Panama City, FL 32405-3721

Tel: (850) 769-0552  
Fax: (850) 763-2177

**FILE**

December 6, 2007

Mr. Stephen M. Seiber  
Chief, Natural Resources Branch  
AAC/EMSN  
501 DeLeon Street, Suite 101  
Eglin Air Force Base, FL 32542-5133

Re: FWS Log No. 2008-F-0056 (formerly 4-P-04-225)  
Date Started: October 24, 2007  
Project Title: Airborne Littoral Reconnaissance  
Technologies Testing, Eglin AFB  
Ecosystem: NE Gulf  
County: Okaloosa County, Florida

Dear Mr. Seiber:

This letter constitutes amendment no. 1 to the June 4, 2004, biological opinion (BO) on the Airborne Littoral Reconnaissance Technologies Testing (ALRT) at Eglin Air Force Base (Eglin), Florida. The Fish and Wildlife Service (Service) received your request dated September 20, 2007, reinitiating consultation. Eglin has determined the revised project will adversely affect nesting loggerhead, green, leatherback, and Kemp's ridley sea turtles as covered under the existing biological opinion for the ALRT project dated June 4, 2004. Eglin has also determined that the revised project would not likely adversely affect (NLAA) non-breeding piping plover and would not result in an adverse modification of designated critical habitat for the piping plover and would have no effect (NE) on the Florida perforate lichen. Our comments are provided in accordance with the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1351 *et seq.*).

The Service concurs with the determination that the revised project is covered under the existing BO for effects on nesting sea turtles. We also concur that the project would NLAA non-breeding piping plover and would not result in adverse modification of the species' designated critical habitat because the project: 1) is outside of designated critical habitat, 2) would not cause physical alteration of piping plover optimal habitat, 3) occurs primarily on the Gulf and mid-island which is not optimal habitat for piping plover on Eglin except for occasional roosting, and 4) impacts would be disturbance to roosting and foraging piping plover as a result of aerial noise from aircraft. Therefore, we consider the amount of noise disturbance on the proposed

intermittent basis to be “insignificant,” meaning there may be disturbance that we cannot meaningfully detect or evaluate. Finally, we concur that the project would have no effect on the Florida perforate lichen because the project will be conducted outside of the species occurrence.

The Service has determined that the work would not increase the likelihood of take of sea turtles beyond that covered in the existing consultation for the ALRT project because, although additional items are to be used on the beach and in the water, the project area coverage remains the same. The test array would cover 0.7 acre of the 10 to 15-acre test site area. However, because of the types of additional materials to be used for the testing on the sea turtle nesting beach, we have revised the Reasonable and Prudent Measures (RPMs) and Term and Conditions (T&Cs). For continuity purposes, we have included all the RPMS and T&Cs in this amendment.

#### Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measures (RPMs) are necessary and appropriate to minimize take of sea turtles as a result of the ALRT activities on the restricted Gulf of Mexico beachfront, Santa Rosa Island controlled by Eglin.

1. A barrier fence shall be installed and maintained in place at the test site when the ALRT activities are conducted during sea turtle nesting season.
2. Personnel movement associated with the ALRT activities shall follow all applicable restrictions to movement along the beachfront as provided verbally, written, or indicated on the ground.
3. Daily surveys for nesting sea turtles shall be conducted if the ALRT activities are conducted during the sea turtle nesting season. Any nests that could be affected by the ALRT project shall be relocated.
4. Participants in the ALRT activities shall be informed and cognizant of the potential effects of human presence and the test activities on sea turtles and behave as instructed.
5. The boundaries of Test Site A-15 shall be clearly delineated when ALRT activities are conducted during the sea turtle nesting season.
6. Eglin shall require the participants of the ALRT activities to designate an observer responsible for identifying signs of sea turtle activity when test activities are to take place at night during the sea turtle nesting season.
7. Eglin shall ensure that beach and dune habitats impaired by the ALRT activities are appropriately restored and maintained per the Santa Rosa Island Programmatic consultation.
8. Eglin shall continue to conduct daily sea turtle nesting surveys on all the beaches under their management during the sea turtle nesting season in accordance with State of Florida permits and protocol.

9. Eglin shall ensure that the terms and conditions are accomplished and completed as detailed in this incidental take statement, including completion of reporting requirements.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Endangered Species Act, Eglin shall comply with the following terms and conditions which implement the reasonable and prudent measures described above, and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. Species Protection

- A. A barrier fence shall be installed when the test array is placed on the beach during the period from May 1 through October 31 or until the last nest within the zone of influence has hatched, to direct nesting sea turtles away from the test area into adjacent beaches that are devoid of obstacles. The fence shall be installed so that sea turtles are unable to become entangled or trapped in the fence or be able to crawl over the fence further into the test area. The fence shall be installed for the duration of the ALRT activities, or if nightly, by ½ hour after sunset and until the next morning after the daily sea turtle surveys and nest protection activities are completed.
- B. Daily early morning surveys shall be required if any portion of the ALRT activities occurs during the period from May 1 through October 31 or until the last nest within the zone of influence has hatched. Nesting surveys shall be initiated 70 days prior to ALRT activities or by May 1, whichever is later. Nesting surveys shall continue through the end of the activities or through September 1, whichever is earlier. Hatching and emerging success monitoring shall involve checking nests beyond the completion date of the daily early morning nesting surveys. If nests are laid in areas where they may be affected by the ALRT activities, eggs must be relocated per the following requirements.
  1. Nesting surveys and egg relocations shall only be conducted by personnel with prior experience and training in nest survey and egg relocation procedures. Surveyors are to have a valid Florida Fish and Wildlife Conservation Commission permit. Nest surveys are to be conducted daily between one-half hour before sunrise and 9 a.m. Surveys are to be performed in such a manner so as to ensure that ALRT activity does not occur in any location prior to completion of the necessary sea turtle protection measures.
  2. All nests within Test Site A-15 shall be relocated to between Eglin Index Nesting Beach Survey markers 3.5 and 5.0. Nests requiring relocation must be moved no later than 9 a.m. the morning following deposition. Relocated nests shall not be placed in organized groupings and randomly staggered along the length and width of the beach so that they do not experience daily inundation by high tides, subject to seasonal severe erosion, or artificial lighting.

3. Nests deposited within areas where ALRT activities have ceased or will not occur for 70 days shall be marked and left *in situ* unless other factors threaten the success of the nest. The nests shall be marked by installation of an on-beach marker at the nest site and a secondary marker at a point landward as possible to assure that future location of the nest will be possible should the on-beach marker be lost.
  - C. On the nights the ALRT activities will be conducted during the period from May 1 to October 31 or until the last nest within the zone of influence has hatched, the following shall be implemented.
    1. Eglin Natural Resources Branch shall notify and provide sea turtle nest location information to the ALRT participants about each nest that is a maximum ½ mile away from Test Site A-15 and is at or past incubation day 60. Participants shall avoid marked sea turtle nests by at least 50 feet during the ALRT activities.
    2. The east and west boundaries of the ALRT activities shall be considered as the same as the Test Site A-15 boundaries and are to be clearly delineated either on the ground or provided in a map to all ALRT participants. If all sea turtle nests have hatched or been evaluated up to ½ mile away, this restriction is not required.
- If the boundaries of the Test Site A-15 are marked on the ground, Eglin Natural Resources Branch or their designee shall check them daily during the ALRT activities. Missing posts or other marking material shall be replaced within 24 hours of discovery. If all sea turtle nests have hatched or been evaluated up to ½ mile away, this restriction is not required.
3. One ALRT participant shall be designated as an observer. The observer shall be responsible for identifying signs of nesting or hatchling sea turtles, and assuring that the test participants do not interfere with nesting sea turtles or impede hatchling sea turtles from emerging from the nest and crawling to the Gulf of Mexico, or obscure signs of sea turtle activity.
  4. If an adult sea turtle is observed on the beach while the ALRT activities are ongoing and an Eglin Natural Resources Branch observer is not onsite, participants shall remain as quiet as possible allowing the turtle to continue her activities. All effort shall be made not to obscure the turtle crawl or nest area. The morning nesting survey shall be responsible for relocating the nest during the following morning. If the sea turtle becomes or appears to be disoriented, actions to ameliorate the impacts will be accomplished immediately. Eglin Natural Resources Branch shall be notified of the occurrence by 9:00 a.m. the next day.
  5. If hatchling turtles are observed on the beach and an Eglin Natural Resources Branch observer is not onsite, all efforts shall be made not to disturb the hatchlings' movement. Efforts shall be made not to obscure the turtle crawls or the nest from where they emerged. If the hatchlings become or appear to be disoriented, actions to

ameliorate the impacts will be accomplished immediately. Eglin Natural Resources Branch shall be notified of the occurrence by 9:00 a.m. the next day.

6. Eglin shall provide a 24-hour contact to the ALRT participants that would be available to respond or to handle emergencies related to harm or injury to sea turtles, and to answer questions related to endangered species and the testing activities.
  - D. If a turtle crawl is seen on the beach during daytime following the daily survey with no associated marked nest, the appropriate Eglin Natural Resources Branch contact, their designee, or the 24-hour contact shall be immediately notified. Care shall be taken not to disturb the crawl and/or nest site.
  - E. Between May 1 and October 31 or until the last nest within the zone of influence has hatched, all direct lighting of the beach and near shore waters associated with the ALRT activities shall be limited to Test Site A-15. If all sea turtle nests have hatched or been evaluated up to  $\frac{1}{2}$  mile, this restriction is not required.
  - F. Conditions and restrictions to the ALRT activities and the Coastal Educational handbook shall be provided to all participants.
2. Habitat Protection, Training Impact Evaluation, Restoration, and Maintenance of Habitats
- A. Vehicles (such as ATVs or Polaris) may be used to site targets but no equipment or vehicles shall be allowed within vegetated areas or dunes that are 5 feet or higher in elevation.
  - B. No ALRT participants shall be allowed on the dunes, vegetated or unvegetated, that are 5 feet or higher in elevation.
  - C. Within 12 hours following ALRT activities, Eglin Natural Resources Branch shall conduct an assessment of the impacts to sea turtles and beach and dune habitats. Within 30 days following the assessment, Eglin is to provide the Fish and Wildlife Service the findings of the assessment, recommendations for habitat restoration, and/or changes in future ALRT activities to rectify or minimize the impacts, if possible. If impacts are determined to be minimal or non-existent, the assessments can be eliminated after 2008.
  - D. Eglin shall ensure that beach and dune habitats impaired by the ALRT activities are appropriately restored and maintained per the Santa Rosa Island Programmatic consultation dated December 1, 2005.
  - E. Informing the ALRT Project Participants about Habitat Protection.
    1. Eglin AFB shall ensure that ALRT participants understand the need to protect beach and dune habitat during the test activities.

2. Eglin AFB shall ensure that the protection of habitat will be implemented by the marking of the habitat boundary, posting no entry areas, and/or providing verbal and written communication to the ALRT participants.

**3. Species Monitoring**

- A. Eglin AFB shall continue implementing their sea turtle nesting survey program on all beaches under their management in accordance with Florida Fish and Wildlife Conservation Commission permit requirements and with Terms and Conditions in the Service's biological opinions on Eglin's INRMP dated March 26, 2002 and the Santa Rosa Island Mission Programmatic dated December 1, 2005, except as noted below.

Daily early morning sea turtle nest surveys are to be conducted between May 1 and September 1. Frequency of hatching and emerging success monitoring after September 1, is to involve checking nests based on expected nest hatch dates.

- B. Eglin shall continue to participate in the State of Florida's Sea Turtle Stranding and Salvage Network. All strandings are to include geographic position data collection and the data is to be incorporated into Eglin's geographic information system.
- C. Eglin shall continue to participate and implement predator control on Santa Rosa Island to ensure depredation rates of sea turtles and their nests is maintained at a rate of less than 5 percent annually.

**4. Reporting**

- A. All Eglin military and civilian personnel involved in any aspect of the ALRT activities and events on Santa Rosa Island shall be notified that upon locating a sea turtle adult, hatchling, or egg that has been harmed or destroyed, to contact the Eglin Natural Resources Branch. Eglin Natural Resources Branch, their designee, or the 24-hour contact shall be responsible for notifying the Florida Fish and Wildlife Conservation Commission Stranding and Salvage Network by Pager: 1-800-241-4653, ID#274-4867; and the U.S. Fish and Wildlife Service Office located in Panama City, Florida at (850) 769-0552. Care shall be taken in handling injured turtles or eggs to ensure effective treatment or disposition, and in handling dead specimens to preserve biological materials in the best possible state for later analysis.
- B. A report describing the actions taken to implement the terms and conditions of this incidental take statement shall be submitted to the Project Leader, U.S. Fish and Wildlife Service, 1601 Balboa Avenue, Panama City, Florida, 32405, within 60 days of the end of the calendar year for each calendar year in which the ALRT activities are conducted. This report shall include the dates of the test activities, assessment and plan of action to address impacts to sea turtles and their habitats within Test Site A-15 on Santa Rosa Island, and hatching and emerging success of nests. If ALRT activities do not take place, a negative report shall be required, with sea turtle nesting survey data for the year. Only

if the ALRT activities on Santa Rosa Island are permanently stopped shall the above conditions not be required.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. The Service believes that no more than 15 acres of habitat for nesting loggerhead, green, leatherback, and Kemp's ridley sea turtles will be incidentally taken. If during the course of the action this level is exceeded, such incidental take represents new information requiring initiation of consultation and review of the reasonable and prudent measures provided. The Corps must immediately provide an explanation of the causes of the taking and review with the service the need for possible modification of the reasonable and prudent measures.

#### **CONSERVATION RECOMMENDATIONS**

Section 7(a)(1) of the Endangered Species Act (Act) directs federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

##### Shorebirds

1. Continue habitat protection and monitoring of the snowy plover so that federal protection of the species is not required in the future.
2. Continue protection of shorebird nesting habitat between the Beach Club and the Destin Pass jetties to protect nesting shorebirds. The area is delineated by perimeter signs and consists of about 46 acres.

##### Santa Rosa Beach Mouse

Continue habitat protection, predator control, and track survey monitoring of the Santa Rosa beach mouse so that federal protection of the subspecies is not required in the future.

##### Florida Perforate Lichen

Eglin should continue or implement habitat protection measures for the Florida perforate lichen to assure the best protection is being implemented on the north and south sides of U.S. Highway 98 on the public use portion of Santa Rosa Island. Conservation measures should include, but are not limited to the following:

1. Eglin should install boardwalks where fence installation is not feasible.
2. Eglin should create additional parking where feasible.

3. Eglin should coordinate and work with Florida Department of Transportation to provide signs to clearly identify parking areas.
4. Eglin should ensure dedicated enforcement of Florida perforate lichen protection is in place and implemented, especially during periods of high public use such as spring break, holidays, and weekends during the summer season. Enforcement would include the proper use of beach accesses and foot trails and adherence to the exclusion areas by beach goers.
5. Design all dune restoration and vegetation planting to minimize impacts to occupied and suitable but unoccupied habitat of the lichen.

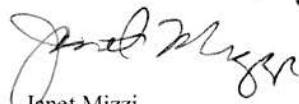
In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

#### REINITIATION NOTICE

This concludes formal consultation on the action outlined in the request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

For this amended biological opinion, the incidental take would be exceeded when the ALRT activities occur outside of Test Site A-15 along the Gulf of Mexico beachfront which has been exempted from the prohibitions of section 9 by this opinion. If you have any questions about this opinion, please contact Lorna Patrick of this office at extension 229.

Sincerely,



Janet Mizzi  
Deputy Field Supervisor

cc:

FWS, Jacksonville, FL (Nicole Adimey and Sandy MacPherson)  
NMFS, Protected Species, St. Petersburg, FL (Robert Hoffman)  
FWC, Imperiled Species Mgt. Section, Tallahassee, FL (Robbin Trindell)

## **APPENDIX C**

### **ESA SECTION 7, MARINE MAMMAL PROTECTION ACT, AND EFH CONSULTATIONS WITH NMFS**



RCS 07-135

**ADVANCED LITTORAL RECONNAISSANCE  
TECHNOLOGIES (ALRT) PROJECT AT  
EGLIN AIR FORCE BASE, FLORIDA**

**FINAL BIOLOGICAL ASSESSMENT**

**EGLIN AIR FORCE BASE, FLORIDA**

**Submitted To:**

**Protected Resources Division  
National Marine Fisheries Service  
9721 Executive Center Drive North  
St. Petersburg, FL 33702**



**Submitted By:**

**Department of the Air Force  
AAC/EMSN  
Natural Resources Section  
501 DeLeon Street, Suite 101  
Eglin AFB, FL 32542-5133**

**SEPTEMBER 2007**

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**LIST OF ACRONYMS, ABBREVIATIONS, AND SYMBOLS**

<b>96 CEG/CEVSN</b>	96 <sup>th</sup> Civil Engineer Group/Environmental Management Division/Stewardship Branch/ Natural Resources Section
<b>AAC</b>	Air Armament Center
<b>AFB</b>	Air Force Base
<b>AL</b>	Antilanding
<b>ALDAI-W</b>	Airborne Laser Diode Array Illuminator - Wide
<b>ALRT</b>	Advanced Littoral Reconnaissance Technologies
<b>ASEL</b>	Average Sound Exposure Level
<b>AT</b>	Antitank
<b>BA</b>	Biological Assessment
<b>cm</b>	Centimeters
<b>EFH</b>	Essential Fish Habitat
<b>EGTTR</b>	Eglin Gulf Test and Training Range
<b>ESA</b>	Endangered Species Act
<b>ft</b>	Feet
<b>GPS</b>	Global Positioning System
<b>HD</b>	Hazard Distance
<b>Hz</b>	Hertz
<b>in</b>	inches
<b>km</b>	kilometers
<b>km<sup>2</sup></b>	Square Kilometers
<b>LOC</b>	Letter of Concurrence
<b>m</b>	Meters
<b>mm</b>	Millimeters
<b>MMPA</b>	Marine Mammal Protection Act
<b>μs</b>	Microseconds
<b>MSFCMA</b>	Magnuson-Stevens Fishery Conservation and Management Act
<b>nm</b>	Nanometers
<b>NOAA</b>	National Oceanic and Atmospheric Administration
<b>NMFS</b>	National Marine Fisheries Service
<b>NOHD</b>	Nominal Ocular Hazard Distance
<b>NOTAM</b>	Notice to Airmen
<b>NOTMAR</b>	Notice to Mariners
<b>NRS</b>	Natural Resources Section
<b>ns</b>	Nanoseconds
<b>ROAR</b>	Rapid Overt Airborne Reconnaissance
<b>SAIC</b>	Science Applications International Corporation
<b>SRI</b>	Santa Rosa Island
<b>“</b>	Attenuation Coefficient
<b>U.S.</b>	United States
<b>USACE</b>	U.S. Army Corps of Engineers
<b>USFWS</b>	U.S. Fish and Wildlife Service

**Executive Summary****EXECUTIVE SUMMARY**

The purpose of this document is to support the consultation process for the Endangered Species Act (ESA) for the Advanced Littoral Reconnaissance Technologies (ALRT) project at Eglin Air Force Base (AFB).

ALRT missions would collect both passive and active multispectral seeker/sensor signature data of obstacles, simulated mines, and barricades in inland environments and littoral waters from several potential systems using an airborne platform. The sensors would typically consist of passive multispectral receivers collecting imagery just as a video camera would, but some missions would be active and have up to a Class IV laser illuminator. Simulated mines and obstacles would be set up from the shore in waters as deep as 4 meters (m) over an area 100 m wide and 30 m long, and inert mines, barricades, and obstacles would be placed on beach and inland areas. The testing is required to evaluate the effectiveness of the various sensors, in the littoral environment and, in particular, the surf zone environment. ALRT missions could occur every few months with current estimates at four to five a year. Some ALRT missions may involve multiple systems flying over the same proposed setup.

The density calculations outlined in Chapter 4 represent the maximum expected number of sea turtles that could enter the proposed area of interest and be affected. Although the chance of a sea turtle entering this area is small (0.10 loggerheads/100 m/year and 0.03 greens/100 m/year), they could potentially risk entanglement in buoy or float lines or entanglement in the hedgehogs placed in the water if they were to enter the testing area. Float lines from boundary markers and targets (PDM-2 mines) may entangle larger sizes of sea turtles. Additionally, the proposed lighting of the buoy markers may attract sea turtles to the floats, resulting in an increased risk of entanglement in the float line. Eglin AFB is committed to assessing the mission activity for opportunities to provide operational mitigations (i.e., trained observers for visual clearance of the test area) in order to decrease the number of animals potentially affected.

ALRT tests would have no effect on Gulf sturgeon if conducted between March and October, since Gulf sturgeon will be in their natal rivers, not in the Gulf of Mexico, during this time frame. If the mission takes place between November and March, ALRT tests are not likely to adversely affect the Gulf sturgeon. No sturgeon have been recorded in the area of interest, and studies show sturgeon appear to use waters that are deeper than those found within the proposed project area. ALRT testing is not likely to adversely modify Gulf sturgeon critical habitat. Hardbottom habitats and artificial reefs would be avoided to alleviate any potential impacts to protected habitat. ALRT tests are not likely to adversely modify essential fish habitat.

The National Marine Fisheries Service (NMFS) would be notified immediately if any of the actions considered in this biological assessment were modified or if additional information on listed species became available, as a reinitiation of consultation may be required. If impacts to listed species occurred beyond what has been considered in this assessment, all operations would cease and the NMFS would be notified. Any modifications or conditions resulting from consultation with the NMFS would be implemented prior to commencement of activities.

**Introduction****Purpose****1. INTRODUCTION****1.1 PURPOSE**

This document is being submitted to fulfill requirements under Section 7 of the Endangered Species Act (ESA) and the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). Briefly, this report addresses potential impacts to federally listed threatened and endangered species within Gulf of Mexico waters associated with Eglin Gulf Test and Training Range (EGTTR) Advanced Littoral Reconnaissance Technologies (ALRT) testing at Eglin Air Force Base (AFB), Florida, as well as essential fish habitat (EFH). This biological assessment (BA), conducted by Eglin's Natural Resources Management Section (96 CEG/CEVSN), is meant to initiate the formal consultation process with the National Marine Fisheries Service (NMFS) pursuant to Section 7 of the ESA and the requirements of the MSFCMA. The objectives of this BA are to:

- Document all federally listed threatened and endangered species and EFH that occur, or may potentially occur, within the region of influence.
- Identify the ALRT actions, as described in the Environmental Assessment, that have the potential to impact, either beneficially or adversely, those documented species.
- Determine and quantify to the extent possible what effects these activities would likely have on federally listed species.

Potential impacts to listed species and habitat from ALRT testing are strictly associated within Test Area A-15 and offshore of A-15.

**1.2 FEDERAL SPECIES CONSIDERED**

Several species of sea turtles and cetaceans occur within the northern Gulf of Mexico and were considered for potential impacts in this biological assessment. Two federally listed fish, the Gulf sturgeon and the smalltooth sawfish, may occur. All cetaceans receive federal protection under the Marine Mammal Protection Act (MMPA). Impacts to marine mammals are addressed in a Letter of Concurrence to National Oceanic and Atmospheric Administration (NOAA) Fisheries. No ESA-listed marine mammals would be affected given the location of the Proposed Action on the Gulf of Mexico nearshore/surf zone environment. The federally listed threatened (T) and endangered (E) species considered for potential impact are:

- Sea turtles
  - Atlantic loggerhead sea turtle (*Caretta caretta*), T
  - Atlantic green sea turtle (*Chelonia mydas*), E
  - Kemp's ridley sea turtle (*Lepidochelys kempii*), E
  - Hawksbill sea turtle (*Eretmochelys imbricata*), E
  - Leatherback sea turtle (*Dermochelys coriacea*), E

Introduction	<i>Federal Species Considered</i>
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- Fish
  - Gulf sturgeon (*Acipenser oxyrinchus desotoi*), T
  - Smalltooth sawfish (*Pristis pectinata*), E

Additional discussion of these species is provided in Chapter 3.

### **1.3 APPLICABLE REGULATORY REQUIREMENTS AND COORDINATION**

The purpose of the ESA of 1973, as amended, is to protect fish, wildlife, and plant species currently in danger of extinction and those species that may become so in the foreseeable future (U.S. Department of Commerce, 1993). The ESA states that "...it is unlawful for any person subject to the jurisdiction of the United States to...take any such species within the United States or the territorial sea of the United States" or "take any such species upon the high seas" (West Publishing Co., 1993). The term take is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct" (West Publishing Co., 1993). Each federal agency is required to review its actions at the earliest possible time to determine whether any action it authorizes, funds, or carries out may affect listed species or critical habitat. If such a determination is made, consultation with the appropriate agency is required.

The U.S Fish and Wildlife Service (USFWS) and the NMFS share the responsibilities for administering the ESA, with the NMFS generally coordinating ESA activities for marine and anadromous species (e.g., sturgeon, sawfish) and the USFWS coordinating ESA activities for terrestrial and freshwater species. ESA responsibilities regarding sea turtles are further split between the two agencies; the USFWS coordinates activities that could impact nesting turtles and turtle nest sites on beaches. Activities within the EGTTR are strictly aquatic. Thus, consultation with the NMFS is applicable in this situation (NMFS, 1997).

The 1996 amendments to the MSFCMA require, among other things, that the NMFS and regional National Fishery Management Councils designate EFH for species included in a fishery management plan. EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. Federal agencies that fund, permit, or carry out activities that may adversely affect EFH are required to consult with the NMFS regarding potential impacts and respond to NMFS and Fishery Management Council recommendations in writing. Adverse impacts are defined as impacts that reduce quality and/or quantity of EFH and may include contamination, physical disruption, loss of prey, and reduction in species' fecundity.

In addition to Executive Order 12114 (1979), Environmental Effects Abroad of Major Federal Actions, and the National Environmental Policy Act of 1969 (Section 1.1), the following applicable acts and regulations were also considered.

- Endangered Species Act (ESA): Provides protection for endangered species and designated critical habitats. ESA prohibits jeopardizing threatened and endangered species or adversely modifying "constituent elements" within critical habitat designations. Actions with no significant impact are not likely to adversely affect

**Introduction*****Applicable Regulatory Requirements and Coordination***

threatened or endangered species or not likely to adversely modify designated critical habitat in accordance with ESA.

- **Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) of Essential Fish Habitat:** The MSFCMA requires that federal agencies consult with the NMFS for any actions authorized, funded, or undertaken or proposed to be authorized, funded, or undertaken that may adversely affect EFH, which may include any substrate or waters necessary for fish to feed, breed, spawn, or grow to maturity. Migratory routes such as rivers or passes to and from spawning grounds must also be considered. “Substrate” includes sediment, hardbottom, underwater structures, and associated biological communities, including jetties, artificial reefs, and shipwrecks. Biological communities are broadly defined as well, including mangroves, tidal marshes, oyster beds, mud and clay burrows, coral reefs, and submerged aquatic vegetation. “Waters” are defined as aquatic areas and their chemical and biological properties (i.e., water quality) and may include open waters, wetlands, estuaries, and rivers. Thus, analyses of effects should consider physical, chemical, and biological properties of water such as nutrients, turbidity, and oxygen concentrations. Impacts that result in a reduction of quality or quantity of EFH are defined as adverse. Adverse effects may be direct, such as physical disruption or contamination, or indirect, such as loss of prey or reduction in fecundity. They may be narrow in scope, affecting only a particular site, or wide-ranging, affecting an entire habitat.

If consultation is required for potential adverse effects to EFH, the NMFS would provide recommendations to the federal agency for avoiding or mitigating potential impacts of the activity to EFH. The federal agency may then respond to the NMFS, describing which procedures it would use to reduce EFH impacts and, if different from NMFS procedures, an explanation for the differences.

Description of Proposed Action	System and Flight Descriptions
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## 2. DESCRIPTION OF PROPOSED ACTION

Under the Proposed Action (Preferred Alternative), the ALRT project would collect signature data from both passive and active multispectral seeker/sensor signature data of obstacles, simulated mines, and barricades in inland environments and littoral waters from several possible systems and airframes. The sensors would typically consist of passive multispectral receivers collecting imagery just as a video camera would, but some missions would be active and have up to a Class IV laser illuminator. Simulated mines, barriers, and obstacles would be set up on beach and inland areas, as well as in a separate specified marine area extending from the shore in waters as deep as 4 meters (m) (13 feet [ft]) over an area 100 m (328 ft) wide.

System and flight descriptions, target field items, and management actions of the Proposed Action are discussed in detail below.

### 2.1 SYSTEM AND FLIGHT DESCRIPTIONS

During each one- to two-week testing series, multiple data-collection flights would be conducted, typically two flights per day. The aircraft, a Bell UH-1 "Huey," the standard airframe for this test, would fly to Test Area A-15 to collect data. Then, the aircraft would land on Test Area A-15 to refuel, download data, check systems, and tie down for the night as required. The Test Area A-15 Fire Department would support all helicopter landing, stationing, and refueling operations. The helicopter landing zone would be marked and static line equipped. The helicopter would take off from Test Area A-15 for a subsequent data-collection flight, then return to the mainland or stay on Test Area A-15 upon mission completion. Flights would occur both day and night, with approximately 25 percent of missions occurring at night between the hours of 2100 and midnight. Altitudes would range from 152 to 914 m (500 to 3,000 ft) for each sortie, with typical speeds from 35 to 70 knots (40 to 81 miles per hour). Aircrew would fly clover leaf, racetrack, and/or parallel tracks as needed to optimize data collection. Other aircraft such as small fixed-winged planes may be used as well for future missions—these planes would not refuel at Test Area A-15. Missions that do not require landing at Test Area A-15 would stage out of local airports. Test Area A-15 is shown in Figure 2-1.

The typical system would consist of the imaging sensor, optical illuminator image recording hardware, navigation tracking software, mechanical cooling equipment for the illuminator, and the aircraft. Lasers are enclosed in a light-tight enclosure with a mechanical shutter for stopping illumination when not over target fields. In addition, a number of laser safety devices are incorporated into the system to prevent inadvertent laser operation. Cameras would record images of the target field. All recording is annotated electronically and synchronized together with Global Positioning System (GPS) time.

## Description of Proposed Action and Alternatives

## System and Flight Descriptions



Figure 2-1. ALRT Target Areas at Test Area A-15

**Description of Proposed Action****System and Flight Descriptions**

Airborne Laser Diode Array Illuminator – Wide (ALDAI-W) and Rapid Overt Airborne Reconnaissance (ROAR®) laser parameters and hazard levels are included in Tables 2-1 through 2-4.

**Table 2-1. ALDAI-W Laser Parameters**

Item	Value
Wavelength	808 nm
Power	0.47 joules/pulse
Pulse width	200 $\mu$ s
Pulse repetition frequency	30 Hz
Beam diameter in horizontal direction	3.0 cm (1.18 in) (half power point)
Beam diameter in vertical direction	4.5 cm (1.77 in) (half power point)
Beam divergence in horizontal direction	0.2985 radians (half power point)
Beam divergence in vertical direction	0.1152 radians (half power point)
Gains of aided device	49 (standard binoculars)
Attenuation coefficient ( $u$ )	$5.0 \times 10^{-7}$ cm <sup>-1</sup> (very clear day)

ALDAI-W = Airborne Laser Diode Array Illuminator – Wide; cm = centimeters; in = inches; nm = nanometers;  $u$  = attenuation coefficient;  $\mu$ s = microseconds

**Table 2-2. ALDAI-W Laser Hazards**

Item	Value
Optical density of eyewear (unaided)	4.76 @ 808 nm
Optical density of eyewear (aided)	6.46 @ 808 nm
NOHD (unaided, $u = 0$ )	47.8 m (156.8 ft)
NOHD (aided, $u = 0$ )	335 m (1,099.1 ft)
HD (skin hazard)	0.08 m (3.15 inches)

ALDAI-W = Airborne Laser Diode Array Illuminator – Wide; HD = hazard distance; m = meters; nm = nanometer; NOHD = nominal ocular hazard distance;  $u$  = attenuation coefficient

**Table 2-3. ROAR Laser Parameters**

Item	Land Value			Marine Value		
	523	690	790	523	250	523
Wavelength (nm)	523	690	790	523	250	523
Power (millijoules/pulse)	500	150	150		250	
Pulse width (ns)		3.5			3.5	
Pulse repetition frequency (Hz)		16.67			16.67	
Beam diameter in X direction (mm)		25			25	
Beam diameter in Y direction (mm)		25			25	
Beam divergence in X direction (mradians)		45		45	15	
Beam divergence in Y direction (mradians)		45		45	15	

Hz = hertz; mm = millimeters; nm = nanometers; ROAR = Rapid Overt Airborne Reconnaissance

**Description of Proposed Action****System and Flight Descriptions****Table 2-4. ROAR Laser Hazards**

Item	Land Value			Marine Value	
	523 nm	690 nm	790 nm	523 nm	
	45 mradians			15 mradians	45 mradians
Optical density of eyewear (unaided)	2.64	2.11	1.93	2.81	2.81
NOHD (unaided, $u = 0$ ) (m)	272	149	187	217	644
HD (skin hazard) (m)	1.30	0.60	0.30	1.70	5.00

HD = hazard distance; m = meter; nm = nanometers; NOHD = nominal ocular hazard distance;  $u$  = attenuation coefficient

Personnel would follow general precautions and procedures during system testing. All personnel that potentially could be exposed to the laser would be required to wear safety goggles. As for laser radiation received on the ground, the ALDAI-W is eye-safe at approximately 150 ft, which is significantly lower than the planned minimum altitude of 500 ft. Thus, animals and unaided personnel on the ground would be safe from stray laser radiation. However, if any personnel were to view the ALDAI-W radiation with optical aids (such as binoculars), they would be well within the Nominal Ocular Hazard Distance (NOHD) of the ALDAI-W.

The ROAR laser as used on land is eye-safe at 271.5 m (890.5 ft), with a planned mission minimum altitude of 310 m (1016.8 ft). For ROAR laser use over the marine environment, the eye-safe distance is 643.74 m (2,112.3 ft.) (Table 2-4).

To minimize the risk of injury to stray ground personnel, the lasers would only actively radiate approximately 50 m before the target array in the water, remain active over the target field, and remain active slightly past it into the water (this would create a buffer zone of approximately 100 m before and after the target fields). Ground and surface personnel would clear the test area before granting permission to actively fire the laser. Personnel would have high-powered flashlights for proper safety control of the area. Ground and marine spotters would be present to support beach, sound, highway, and Gulf range clearance. The Air Force would issue Notice to Airmen (NOTAM) and Notice to Mariners (NOTMAR). All personnel would wear laser goggles.

The aircrew engineer and pilot would be able to communicate with ground operations and Eglin AFB at all times. Any test personnel could call for a laser shutdown, and the pilot and backseat engineer both would have a master shutdown switch. The aircrew engineer would only operate the laser while crossing areas within or immediately adjacent to the target areas. A dual-mode indicator would be used to validate laser operation.

## 2.2 TARGET FIELD

Test Area A-15 would provide an ideal background for obtaining imagery over sandy coastal terrain approximating a real threat scenario. In keeping with the program requirements to detect minefields in the littoral zone, the ALRT team would utilize three areas of Test Area A-15: the Gulf coast beach area, the sound, and an intermediate area between the two coastal areas (Figure 1-1). Targets would also be placed in the waters of the Gulf (in particular the surf zone area) and sound (out to 4-m [13-ft] depths).

<b>Description of Proposed Action</b>	<i>Target Field</i>
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### **2.2.1 Test Duration**

Each test series would last one to two weeks. Personnel would set up the target field over three to four days, the mission flights would commence, and then personnel would remove the targets from the test site over two to three days. ALRT missions could occur every few months; the current estimate is four to five times per year.

A typical mission scenario would be as described below:

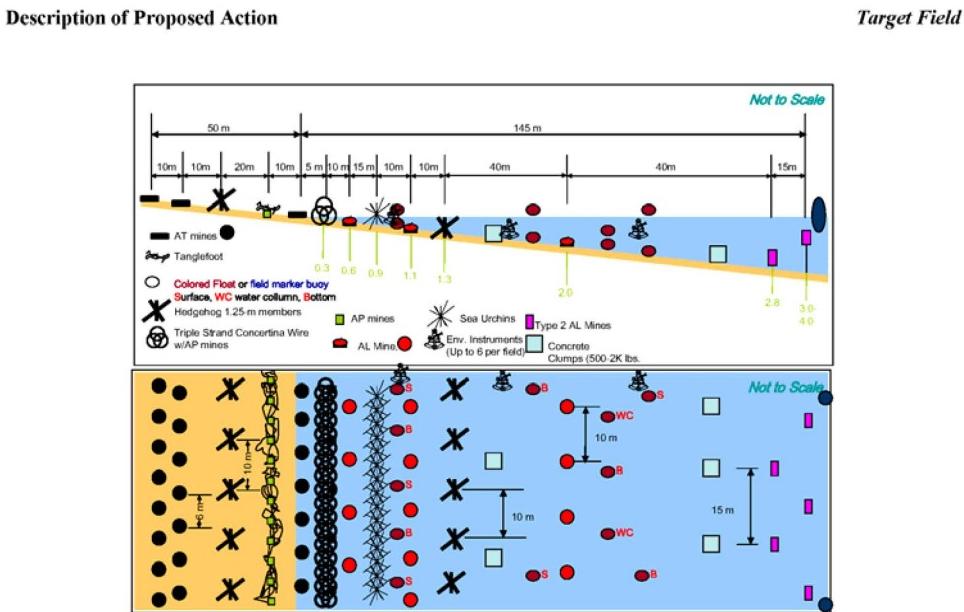
- Three to four days: target set up and mission preparation
- Four to six days: conduct mission flights
- Two to four days: weather backup
- Two to three days: target removal and cleanup

NOTMARS would be broadcast to the general public during and after set-up. Either reflective or lighted buoys would be placed approximately 50 m [164 ft] away from the perimeter of the array, notifying boats of restricted access to the area. During the test mission, a Navy/Air Force boat would be present in the water to intercept and warn other boats approaching the test area. There have been no such boat incursions reported during the previous testing.

### **2.2.2 Minefield, Barrier, and Obstacle Layouts**

Activities associated with testing include placement of inert mines and obstacles (such as concrete blocks and concertina wire) on the beach front. M20 antitank mines, PDM-1M antitank/antilanding craft mines, or other similar mines that are approximately 14 inches in diameter, plus baseplate accessories as required, would be used in the surf zone at 0.5-m (1.64-ft) depths.

The minefield, barrier, and obstacle layouts required for this test include linear patterned and random scattered mines, barriers, and obstacles on the beach and in the water. Figure 2-2 illustrates the proposed minefield, barrier, and obstacle layout. Personnel would place inert mines in each area to simulate actual mine layouts in accordance with current available doctrine. To minimize the movement or loss of mines, each individual target would be anchored, tied together, inventoried, and monitored for proper setup. These devices would be positioned near the edge of the water or in the water up to 4 m (13 ft) deep and anchored primarily with screw anchors or, occasionally, poles jetted into the sand. To raise and lower some of the heavier targets, a boat/barge with equipment would be necessary. A scuba diver would then secure each mine with a screw anchor.



**Figure 2-2. Proposed Action ALRT Target Field Layout**

Mine positions would be recorded using a hand-held differential GPS system at the time of installation in the target field. Personnel would record this "truth data" on the minefield layout chart and use it to score the actual data results to determine horizontal location accuracy. For reference, areas of Test Site A-15 to be flown over would be marked on the perimeter with 1.22 square meters (4 square foot) painted aluminum panels and/or small lights (pointed upward). These panels and lights would remain in place throughout the flight series. For night operations, strobe lights would be set up to direct the flight paths accordingly.

The inert mines would include M20 inert antitank, PDM-1M inert antilanding craft, and PDM-2 inert antilanding mines (Figures 2-3 through 2-5). These mine targets are representative of the different materials and types of antitank mines encountered in littoral scenarios and are readily available from the current Navy project inventory. They would also provide a representative sampling of the sizes and spectral signatures encountered in real-world scenarios. Obstacles would include floats and buoys, scientific instrumentation, tetrahedrons, structural hedgehogs, and concrete cubes 1.2 m × 1.2 m × 1.2 m (4 ft × 4 ft × 4 ft) (Figure 2-6). Barricades would include concertina wire or wire rolls that could simulate concertina wire (Figure 1-7), tanglefoot barbed wire fencing (Figure 2-8), and structural sea urchins, which are three pieces of steel rebar welded in the shape of a teepee (Figure 2-9).

**Description of Proposed Action****Target Field****Figure 2-3. M20 Inert Antitank Mines****Figure 2-4. PDM-1M  
Antilanding  
Craft Mines****Figure 2-5. PDM-2M Inert Mine****Figure 2-6. Structural Hedgehog****Figure 2-7. Simulated Concertina Wire**

**Description of Proposed Action**      **Target Field****Figure 2-8. Tanglefoot****Figure 2-9. Structural Sea Urchins Wrapped in Fence**

These targets would be placed on the beach and in the surf zone. The obstacles and barricades would be no longer than 100 m (328 ft); however, M20 inert antitank mines may be scattered around the other items but would be located within the potential placement locations (Figure 2-1). Similar barricades or obstacles may be used both in the surf zone and on the beach. The entire area would never be totally filled, only various small sections of the total area would have typical minefield layouts at any given time. There would not be more items emplaced than current inventory allotments allow. Those inventories consist of up to 1,000 mine-like objects varying in size from a few inches up to 36 inches in diameter and other targets such as buoys varying in size up to 36 inches, marker panels typically 4 ft by 4 ft, various wire obstacles,

<b>Description of Proposed Action</b>	<i>Target Field</i>
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various light-to-medium antilanding obstacles, and various instrumentation for monitoring the environment.

After the objects are put into place, positional surveys would be conducted. For in-water objects, a hand-held GPS would be used to locate the objects by either walking into the water or using a kayak to float out. Also, divers would check the targets daily to verify that the objects are there and clean them off. During these daily checks, divers would survey the area for protected marine species.

Certain mines, obstacles, and barricades have previously been approved for use at Santa Rosa Island (SRI) for other missions. The Proposed Action would expand on the list of approved items, which are detailed below.

- Floats and lights to mark the boundary of the test field area and floats throughout the target field area to serve as additional targets.
- Water quality measurement instrumentation positioned on a tall screw anchor (four total).
- Type 2 inert antilanding craft mines at 2- to 3-m (6.6- to 9.8-ft) depths and 15 m (49.2 ft) apart.
- Structural hedgehogs (1 m × 1 m × 1 m [3.3 ft × 3.3 ft × 3.3 ft]) in approximately 1.3-m (4.3-ft) depth with 10-m (32.8-ft) spacing.
- Structural sea urchins (2 m [6.6 ft] tall) in 0.9-m (2.95 ft) depth and 100 m (328 ft) long.
- Concertina wire or wire rolls manufactured to simulate concertina wire in .3 m (1 ft) of water and 100 m (328 ft) long.
- Additional antilanding craft mines in the water, in particular at 0.6-m (2-ft), 1.1-m (3.6-ft), and 2-m (6.5-ft) depths at 6 to 10 m (19.7 to 32.8 ft) apart.
- A tangle-foot barbed wire array 10 m (32.8 ft) from the water edge.
- Additional row of structural hedgehogs (1 m × 1 m × 1 m [3.3 ft × 3.3 ft × 3.3 ft]) structural hedgehogs 30 m (98.4 ft) from the water edge.
- Row of antitank mines buried in the sand by hand.
- A trailer on the beach to capture data from devices located in the water that collect water-clarity information. These devices would be positioned around the edge of the target field and would need to be anchored to screw anchors or to poles jetted into the sand in water as deep as 3 m (9.8 ft) deep.

The array would remain in place at night, with reflective buoys marking the area to keep boat traffic out. As soon as the last flight test is complete, personnel would remove all of the mines, obstacles, and barricades and account for their locations.

<b>Description of Proposed Action</b>	<b>Avoidance and Minimization Measures</b>
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### **2.3 AVOIDANCE AND MINIMIZATION MEASURES**

To minimize impacts to sea turtles and other sensitive SRI species, the avoidance and minimization measures below would be required as part of the Proposed Action. Many of these requirements are Terms and Conditions from the Eglin ALRT Testing Biological Opinion (USFWS, 2004). Sea turtle season at Eglin AFB is 1 May to 31 October.

- If any portion of the ALRT testing would occur during the period from 1 May through 31 October, the Natural Resources Section (NRS) would conduct daily early morning sea turtle surveys. Nesting surveys at Test Area A-15 would begin 70 days prior to ALRT activities, or by 1 May, whichever is later. Nesting surveys would continue through the end of the activities or through 1 September, whichever is earlier. After this period, the NRS would continue to check nests based on anticipated hatching dates.
- The NRS would relocate all sea turtle nests in the Test Area A-15 area to adjacent beaches at least 50 ft from the boundaries of the test site. All nests would be relocated between INBS marker 3.5 and 4.5 if testing is conducted during the nesting season. Nest relocations associated with the ALRT project would cease when project activities no longer threatened nests.
- During sea turtle season, ALRT personnel would install a fence (e.g., silt fence) to direct sea turtles away from the common and simulated concertina wire, structural sea urchins, and tanglefoot wire on the beach and to adjacent beaches. This silt fence would serve to minimize but not eliminate potential take of nesting sea turtles. Section 7 consultations would determine the amount and extent of take.
- On the nights that ALRT activities would be conducted, the NRS would provide location information to test participants concerning each sea turtle nest within 0.5 miles of Test Area A-15 that was at or past incubation day 60.
- Participants would avoid marked sea turtle nests by at least 50 ft.
- On the nights that ALRT activities would be conducted, the east and west boundaries of Test Area A-15 would be clearly posted, marked on the ground, or provided on maps to participants.
- On the nights that ALRT activities would be conducted, one testing participant would serve as an observer to be responsible for identifying signs of nesting or hatchling sea turtles. The observer would be responsible for assuring that the project participants did not interfere with nesting sea turtles, impede hatchling sea turtles from emerging from the nest and crawling to the Gulf of Mexico, or obscure signs of sea turtle activity.
- If an adult or hatchling sea turtle was observed on the beach while the ALRT testing was ongoing, testing would stop until the turtle had left the beach. Participants would remain as quiet as possible, allowing the turtle to continue activities. All efforts would be made not to obscure the turtle crawl or nest area.
- Between 1 May and 31 October, Eglin would provide a 24-hour contact to the test participants that would be available to respond to emergencies related to harm or injury to sea turtles and to answer questions related to endangered species and the testing activities (POC Bob Miller, 1-888-328-7351, or Bruce Hagedorn, 1-888-879-5420).

<b>Description of Proposed Action</b>	<b>Avoidance and Minimization Measures</b>
<ul style="list-style-type: none"><li>• Between 1 May and 31 October, all direct lighting of the beach and nearshore waters associated with the ALRT activities would be limited to Test Area A-15. If all sea turtle nests have hatched or been evaluated within 0.5 mile, this restriction is not required.</li><li>• Between 1 May and 31 October, all set-up and take-down activity associated with ALRT testing on the beach and in the surf zone would occur during daytime hours and after the morning sea turtle survey is completed.</li><li>• Participants would receive conditions and restrictions to the ALRT activities.</li><li>• Eglin would provide an educational overview for the ALRT participants in the form of a presentation to all participants to explain the requirements.</li><li>• No equipment or vehicle use would occur on or within dune habitat.</li><li>• No project participants would traverse dunes, vegetated or unvegetated, that are 5 ft or higher.</li><li>• If habitat restoration is necessary, it would be designed and conducted to minimize impacts to sea turtles in accordance with Florida Department of Environmental Protection guidelines detailed in the <i>ALRT Biological Opinion Terms and Conditions</i>.</li></ul>	

**Species and EFH Descriptions****Sea Turtles****3. SPECIES AND EFH DESCRIPTIONS**

Protected species potentially occurring in the northern Gulf of Mexico include five species of sea turtles, two fish, one sirenian, and 29 species of cetaceans. While any of the sea turtle species could potentially occur within the region of influence of the ALRT test, only one cetacean species has the potential to be found nearshore. The bottlenose dolphin (*Tursiops truncatus*) is the cetacean species that frequents the nearshore areas. These dolphins are not protected under the Endangered Species Act; however, all cetaceans are protected under the Marine Mammal Protection Act. Potential impacts to dolphins are addressed in a Letter of Concurrence to NOAA Fisheries. After consulting with NOAA Fisheries headquarters office about ALRT missions, Eglin is submitting a formal request for a Letter of Concurrence (LOC) because NRS believes there will be no take of marine mammals from ALRT missions.

The federally endangered West Indian manatee (*Trichechus manatus*), a sirenian, is a rare visitor to the northern Gulf and prefers inland bays and estuaries. The chance that the West Indian manatee would be found in the mission area is remote and that species is not included in the impact analysis of this assessment.

The smalltooth sawfish is a federally endangered fish species. Although this species has historically ranged throughout the Gulf of Mexico from Texas to Florida, they are now only commonly found in the Everglades and in shallow areas with mangrove forests in Florida Bay and the Florida Keys as well as off southern Florida. Smalltooth sawfish typically reside within 1 mile of land in estuaries, shallow banks, sheltered bays, and river mouths. Occasionally, they are found offshore on reefs or wrecks and over hard or mud bottoms. Like the manatee, only a remote chance exists for this species to be in the area of interest and it is, therefore, excluded from further impact analysis.

The Gulf sturgeon (*Acipenser oxyrinchus desotoi*), listed as federally threatened, is an anadromous fish that spends part of its life cycle in the marine environment and part in riverine environments. The Gulf sturgeon may be found in the Gulf during the winter months. For this biological assessment, consultation considers those species protected under the Endangered Species Act that would reasonably occur within the project area, including the five species of sea turtles and the Gulf sturgeon.

**3.1 SEA TURTLES**

Five species of sea turtles inhabit the waters in or near the eastern Gulf. The sea turtle species are Atlantic loggerhead (*Caretta caretta*), Atlantic green (*Chelonia mydas*), leatherback (*Dermochelys coriacea*), hawksbill (*Eretmochelys imbricata*), and Kemp's ridley (*Lepidochelys kempii*). Of the five species protected by state and federal governments, all but the loggerhead are classified as endangered. The loggerhead is classified as threatened by both the Florida and the federal governments (Patrick, 1996). The smallest species is the Kemp's ridley (75 to 100 pounds), and the largest is the leatherback (up to 2,000 pounds and 8 ft long). Sea turtles spend their lives at sea and only come ashore to nest. It is theorized that young turtles, between the time they enter the sea as hatchlings and their appearance as subadults, spend their time drifting in ocean currents among seaweed and marine debris (Carr, 1986a, 1986b, 1987). The

**Species and EFH Descriptions*****Sea Turtles***

population numbers of sea turtles has been gravely reduced during the last century due to illegal domestic harvesting of eggs and turtles in the United States and its territories as well as other important nesting areas around the world. Sea turtles are identified in Table 3-1 according to their status of federal protection in the Gulf of Mexico. Density and abundance estimates were derived from NMFS aerial surveys (Davis et al., 2000).

**Table 3-1. Sea Turtle Statistics From Surveys of the Continental Shelf (1996–1998)**

Shelf	Number Sighted	Individuals/100 km <sup>2</sup>	Abundance Estimate
Loggerhead			
Overall	84	4.077	503
Summer	39	3.891	480
Winter	45	4.253	524
Kemp's ridley	2	0.097	12
Leatherback	4	0.194	24
Unidentified	7	0.340	42

Source: Davis et al., 2000

**3.1.1 Loggerhead Sea Turtle**

The loggerhead turtle is federally listed as threatened worldwide and gained its status on 28 July 1978. Loggerhead nests in Florida account for 90 percent of all loggerhead nests in the United States. They are the most commonly seen sea turtle in the southeastern United States and may be found near underwater structures and reefs (USFWS, 1996). It was concluded that the loggerhead turtle population is continuing to decline in the southeastern United States, and shrimping is thought to have played a significant role in this decline (USFWS, 1996). The diet of loggerheads consists of gastropods, mollusks, coelenterates, and cephalopods (USFWS, 1996).

**3.1.2 Kemp's Ridley Sea Turtle**

The Kemp's ridley sea turtle received its endangered status, under the ESA, on 2 December 1970. Adults have the most restricted distribution of any sea turtle and are usually confined to the Gulf of Mexico, while postpelagic turtles may be found over crab-rich sandy or muddy bottoms. As hatchlings, the species presumably eat Sargassum and small organisms associated with the floating *Sargassum*. Adults feed mainly on crabs (USFWS and NMFS, 1992).

**3.1.3 Green Sea Turtle**

The green sea turtle was listed as threatened on 28 July 1978, in all its eastern range of North America, except in Florida, where it is listed as endangered. In the United States, it nests on southern Florida beaches with a few exceptions in the northern Gulf of Mexico and North Carolina (USFWS, 1996). Green turtles nest from May to August. Primarily a tropical herbivore, the juveniles are frequently found in the Gulf of Mexico in areas where there is an abundance of seagrass (USFWS, 1996).

**3.1.4 Leatherback Sea Turtle**

The leatherback sea turtle was originally listed as endangered on 2 June 1970. Leatherbacks are a migratory species with a worldwide distribution. This species nests in the tropics but may

**Species and EFH Descriptions*****Sea Turtles***

range as far north as Canada and the northern Pacific. In the United States, nesting occurs in Florida, beginning in February (USFWS, 1996). The leatherback feeds primarily on jellyfish but occasionally will eat sea urchins, squid, crustaceans, tunicates, fish, blue-green algae, and floating seaweed (USFWS, 1996).

### **3.1.5 Hawksbill Sea Turtle**

The hawksbill sea turtle was originally listed as endangered on 2 June 1970. It remains endangered as listed by the state of Florida and the USFWS under the ESA (USFWS, 1990; NMFS and USFWS, 1995; USFWS, 1996). Continued illegal international trade in tortoise shell and use of hawksbill meat and eggs are a major threat to the turtles' survival. Though rare in northeastern Gulf waters, nesting for the hawksbill turtle has been reported along the Gulf coast and is seen with some regularity in the waters near the Florida Keys (MMS 1986; NMFS and USFWS, 1993). Although mostly a spongivore, this species feeds on other invertebrates that encrust coral reefs (NMFS and USFWS, 1993). Commercial exploitation is the major cause of the continued decline of the species (USFWS, 1996).

### **3.2 GULF STURGEON**

The Gulf sturgeon (*Acipenser oxyrinchus desotoi*) is federally listed as threatened. It is an anadromous fish that migrates from salt water into large coastal rivers to spawn and spend the warm months. This species occurs predominantly in the northeastern Gulf of Mexico, where it ranges from the Mississippi Delta east to the Suwannee River in Florida, and can also be found in the bays and estuaries throughout its range. Gulf sturgeons have never been found in water deeper than 60 feet in waters offshore of Eglin AFB (USFWS, 2003). The sturgeon that have been located offshore of Eglin AFB were found in less than 20 feet of water (USFWS, 2003). The Gulf sturgeon is thought to feed primarily during the winter and spring in offshore or estuarine habitats. Food items include amphipods, isopods, annelids, dipterans, blue crab parts, lancelets, brachiopods, and plant material (Huff, 1975; Mason and Clugston, 1993).

### **3.3 GULF STURGEON CRITICAL HABITAT**

Critical habitat for the Gulf sturgeon was designated in March 2003, based on the primary constituent elements essential for its conservation, as defined in the 2003 Federal Register. These seven primary constituent elements are:

- (1) Abundant food items, such as detritus, aquatic insects, worms, and/or mollusks, within riverine habitats for larval and juvenile life stages; and abundant prey items, such as amphipods, lancelets, polychaetes, gastropods, ghost shrimp, isopods, mollusks and/or crustaceans, within estuarine and marine habitats and substrates for subadult and adult life stages.
- (2) Riverine spawning sites with substrates suitable for egg deposition and development, such as limestone outcrops and cut limestone banks, bedrock, large gravel or cobble beds, marl, soapstone, or hard clay.

**Species and EFH Descriptions****Gulf Sturgeon Critical Habitat**

- (3) Riverine aggregation areas, also referred to as resting, holding, and staging areas, used by adult, subadult, and/or juveniles, generally, but not always, located in holes below normal riverbed depths, are believed necessary for minimizing energy expenditures during fresh water residency and possibly for osmoregulatory functions.
- (4) A flow regime (i.e., the magnitude, frequency, duration, seasonality, and rate-of-change of fresh water discharge over time) necessary for normal behavior, growth, and survival of all life stages in the riverine environment, including migration, breeding site selection, courtship, egg fertilization, resting, and staging, and for maintaining spawning sites in suitable condition for egg attachment, egg sheltering, resting, and larval staging.
- (5) Water quality, including temperature, salinity, pH, hardness, turbidity, oxygen content, and other chemical characteristics necessary for normal behavior, growth, and viability of all life stages.
- (6) Sediment quality, including texture and chemical characteristics, necessary for normal behavior, growth, and viability of all life stages.
- (7) Safe and unobstructed migratory pathways necessary for passage within and between riverine, estuarine, and marine habitats (e.g., an unobstructed river or a dammed river that still allows for passage).

Gulf sturgeon critical habitat is composed of 14 geographic areas, or units. The units collectively encompass almost 2,800 river kilometers and over 6,000 square kilometers of estuarine and marine habitat. Critical habitat extends from the mean high-water line to 1 nautical mile offshore for the Gulf of Mexico. Of interest for purposes of this biological assessment are Units 10 and 11. Unit 10 includes the Santa Rosa Sound, bounded on the west by the Florida State Highway 399 bridge in Gulf Breeze, Florida, and the east by U.S. Highway 98 bridge in Fort Walton Beach, Florida. Unit 11 includes the Florida nearshore Gulf of Mexico Unit in Escambia, Santa Rosa, Okaloosa, Walton, Bay, and Gulf Counties in Florida.

Gulf sturgeon are generally found at depths of less than 6 m (19.7 ft) and are contained within 1 nanometer (nm) (1.9 kilometers [km]) from the shore. Gulf nearshore substrate contains unconsolidated, fine medium-grain sands that support crustaceans such as mole crabs, sand fleas, various amphipod species, and lancelets (Abele and Kim, 1986; Rowe and Menzel, 1971), which are all part of the Gulf sturgeon diet. Because of this primary ecological function (defined as primary constituent element 1), Unit 11, the nearshore (up to 1 nm (1.9 km) Gulf of Mexico waters between Pensacola and Apalachicola Bays offshore, has been designated as critical habitat for the Gulf sturgeon.

According to the Federal Register, Unit 10, the Santa Rosa Sound, is designated as critical habitat (defined as primary constituent element 7) because it provides one continuous migratory pathway between Choctawhatchee Bay, Pensacola Bay, and the Gulf of Mexico for feeding and genetic interchange. Within the last 3,000 years, periodic shoaling closed the opening of Choctawhatchee Bay to the Gulf of Mexico. For many years, the Santa Rosa Sound provided the only way for Choctawhatchee River Gulf sturgeon to migrate to the Gulf of Mexico (Wakeford, 2001). Recent locations of subadult and adult Gulf sturgeon within the Santa Rosa Sound confirm its present use by the Choctawhatchee River subpopulations (Fox et al., 2002; Parauka,

**Species and EFH Descriptions****Gulf Sturgeon Critical Habitat**

2003). Gulf sturgeon have been located mid-channel and in shoreline areas in 2 to 5.2 m (6.6 to 17.1 ft) depths and sand substrate. The approximate length of this critical habitat unit is 52.8 km (33 miles).

### **3.4 ESSENTIAL FISH HABITAT**

The Magnuson-Stevens Fishery Conservation and Management Act requires federal agencies to assess potential impacts to essential fish habitat for commercial fisheries managed by the NOAA Fisheries. EFH is described as those waters and substrate necessary for fish spawning, feeding, or growth to maturity. Some potential threats to essential fish habitat are certain fishing practices, marina construction, navigation projects, dredging, alteration of freshwater input into estuaries, and runoff. Many commercial species are migratory, moving from estuaries to open Gulf waters, or up and down the coast with the seasons. Numerous species pass through or occur in the region and, thus, the essential habitat of one commercial fish species or another at any given time of the year may fall within the EGTTR (Gulf of Mexico Fishery Management Council, 1998).

Essential fish habitat has been identified by the NMFS for several species within the EGTTR; these species and their habitat by life stage are presented in Table 3-5.

#### **3.4.1 Seagrasses**

The Florida Marine Research Institute estimates total seagrass coverage in Choctawhatchee Bay and the Okaloosa County portion of Santa Rosa Sound at 4,160 acres (Sargent et al., 1995). The nearest major seagrass bed in the Gulf of Mexico is located outside of the study area (Figure 3-1). The habitat on the Gulf side and the sound side of Santa Rosa Island is a sandy/silty substrate, which does not support seagrass beds (Figure 3-2). Therefore, there are no potential impacts to seagrasses that serve as essential fish habitat.

#### **3.4.2 Artificial Reefs**

Artificial reefs consist of materials deposited on the ocean floor, usually for the purpose of enhancing fishing or other recreational activities (Table 3-6). Artificial reefs provide bottom relief and habitat for fish and other marine species in areas that may otherwise be featureless. Although the material is often purposely deposited, shipwrecks are another source of reefs (Figure 3-1). The U.S. Army Corps of Engineers (USACE) regulates artificial reef construction in United States waters through its Permits and Evaluation Branch. Materials authorized by the USACE for reef construction include concrete and steel culverts, Army tanks and steel-hulled or ferroconcrete vessels (without engines), construction-grade aluminum alloys, and ferrous metals such as bridges, concrete blocks, slabs, natural limestone boulder-size rocks, and similar material (USACE, 1995).

**Species and EFH Descriptions****Essential Fish Habitat**

Figure 3-1. Known Seagrass Locations at Test Area A-15, the Proposed Area of Interest



Figure 3-2. Sandy/Silty Substrate Located on Both the Gulf and Sound Side of the Proposed Area of Interest

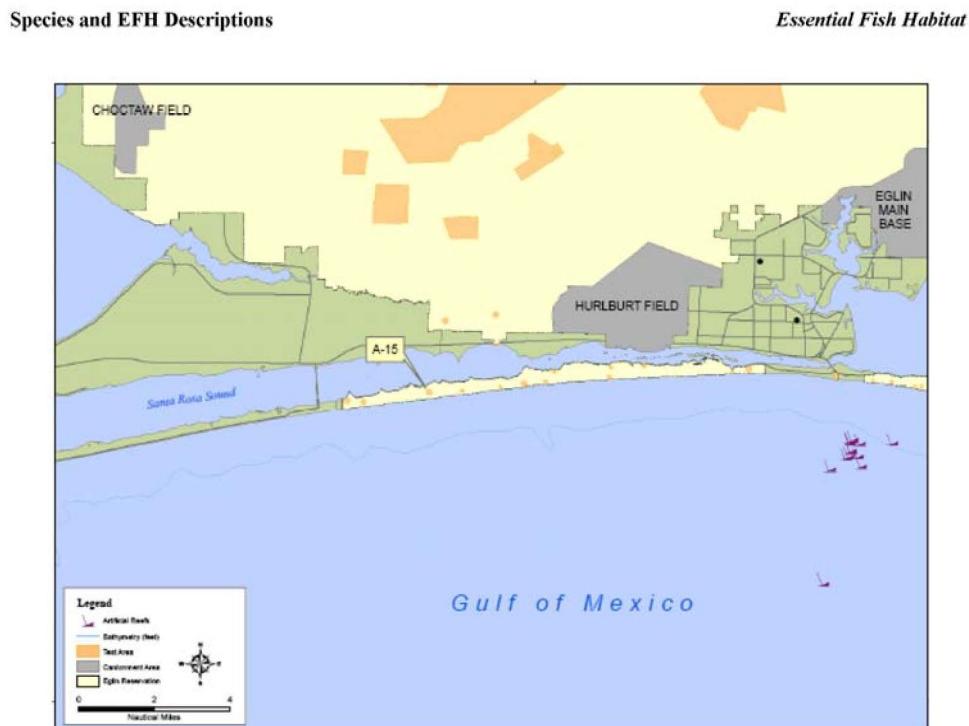
## Species and EFH Descriptions

## Essential Fish Habitat

Table 3-2. Managed Species for Which Essential Fish Habitat Has Been Identified in the EGTR

Species	Life Stages	Habitat
Black grouper	Adult, juveniles/subadults, larvae, eggs (spawning area)	Hardbottom; shore to 150 m
Brown shrimp	Adult	Soft bottom; estuarine dependent
Cobia	Adult, juveniles/subadults, larvae, eggs (spawning area)	Pelagic; drifting or stationary floating objects
Corals	All life stages	Hardbottom
<i>Sargassum</i>	All life stages	Pelagic
Dolphin (mahi)	Adult, juveniles/subadults, larvae, eggs (spawning area)	Pelagic; floating objects
Gag grouper	Adult	Hardbottom
Greater amberjack	Adult, juveniles/subadults, larvae, eggs (spawning area)	Pelagic and epibenthic; reefs and wrecks; to 400 m
Gray snapper	Adult	All bottom types; 0 to 130 m
Gray triggerfish	Adult	Hardbottom
King mackerel	Adult	Pelagic
Lesser amberjack	Adult, juveniles/subadults, larvae, eggs (spawning area)	Pelagic
Lane snapper	Adult, juveniles/subadults, larvae, eggs (spawning area)	Soft and hardbottom; 0 to 130 m
Little tunny	Adult, juveniles/subadults, larvae, eggs (spawning area)	Pelagic
Pink shrimp	Adult (spawning area)	Soft and hardbottom; inshore to 65 m
Red drum	Adult (spawning area)	Soft bottom, oyster reefs, estuarine; to 40 m
Red grouper	Adult, juveniles/subadults, larvae, eggs (spawning area)	Hardbottom; 3 to 200 m
Red snapper	Adult, juveniles/subadults, larvae, eggs (spawning area)	Hardbottom, pelagic
Scamp	Adult	Hardbottom
Stone crab	Adult (spawning area)	Soft, hard or vegetated bottom
Spiny lobster	Adult	Hardbottom
Spanish mackerel	Adult, juveniles/subadults, larvae, eggs (spawning area)	Pelagic; inshore to 200 m
Tilefish	Adult (spawning)	Soft bottom, steep slopes; 80 to 540 m
Vermillion snapper	Adult, juveniles/subadults, larvae, eggs (spawning area)	Hardbottom; 20 to 200 m
White shrimp	Adult, juveniles/subadults, larvae, eggs (spawning area)	Soft bottom; inshore to 40 m
Yellowtail snapper	Adult, juveniles/subadults, larvae, eggs (spawning area)	Hardbottom; 0 to 180 m

Source: Gulf of Mexico Fishery Management Council, 1998; NOAA, 1985



**Figure 3-3. Artificial Reefs in the Gulf of Mexico Around Eglin Air Force Base**  
(Test Area A-15 is the proposed area of interest for this mission.)

**Determination of Effects*****Sea Turtles*****4. DETERMINATION OF EFFECTS****4.1 SEA TURTLES**

The issues of concern regarding ALRT tests are the potential effects to sensitive species from entanglement or entrainment caused by the objects located in the water.

Of the five species of marine turtle found in the Gulf of Mexico, two are known to nest along Eglin beaches: the Atlantic loggerhead and the Atlantic green. Sea turtle nesting in the northwest region of Florida generally initiates in mid-May, with turtles beginning to congregate offshore in the March/April time frame. Peak nesting activity occurs in June and July, and nesting generally concludes by the end of August. Seasonal timing of the project could potentially affect sea turtles and hatchlings.

Stranding reports for all five sea turtle species have been documented from the northern Gulf region based on beach index nesting zones. According to the nesting and stranding information, there is a potential for any of the five sea turtle species to occur on Santa Rosa Island, but loggerheads and green turtles are the only ones that have been documented in the proposed area of interest (Figure 4-1). This area of interest, Test Area A-15, falls within three index beach nesting zones over a distance of 1 mile or 1,609.34 meters. ALRT project personnel would have equipment set out no more than 30 meters offshore, and Eglin Natural Resources Section believes that using the historical nesting/false crawl data from Test Area A-15 is the best indicator of species present in the water (NMFS, 2007). The majority of turtles this close to the shoreline will be female turtles coming to shore or hatchlings finding their way into the water. There is a small possibility of foraging turtles in this area as well.

A density estimate for turtles in the water can be made by using the length of shoreline for the area of interest (1 mile or 1,609.34 meters), the historical number of nests and false crawls within that area, and the number of years surveyed. Although the beach has been surveyed for 18 years, green turtles technically nest every other year, as opposed to loggerheads, which nest every year. In order to be conservative, the historical number of green turtle nests/false was divided by the number of years green turtle nests were present. Loggerhead nests/false crawls were divided by the entire 18 years. This division yields an average number of turtles per year within the 1-mile area. However, ALRT testing would only take place over a distance of 100 meters. By dividing the average number of turtles per year by the total distance (in meters) of the proposed area of interest and multiplying that number by 100 meters, the density of turtles per 100 meters per year within the proposed area of interest is calculated as shown in Table 4-1. The chance of a turtle being in the proposed area of interest during ALRT testing is extremely small for both loggerhead and green turtles, especially considering the objects would only be in the water for one to two weeks at a time.

## Determination of Effects

## Sea Turtles

Table 4-1. Density of Turtles Within Proposed Area of Interest

Species	Total Distance (m) of Proposed Area of Interest (A-15)	Historical # of Nests/False Crawls Within that Area	# of Years Surveyed	Average # of Turtles per Year	# of Turtles per 100 m per Year
Loggerhead	1609.34	30	18	1.67	0.10
Green	1609.34	5	11	0.45	0.03



Figure 4-1. Nests and False Crawls for Loggerhead and Green Turtles Within Index Nesting Beach Zones 10, 9, and 8 (from left to right) Over an 18-Year Period.

Although the chance is very small, if sea turtles did enter the proposed area of interest, potential affects could include the risk of entanglement or entrapment in any of the obstacles or barricades in the water. Additionally, the proposed lighting of the buoy markers may attract sea turtles to the floats, resulting in an increased risk of entanglement in the float line.

The hedgehogs placed in waters 1.3 m (4.3 m) deep and 10 m apart and those placed 10 m from the water's edge pose an entrapment risk to sea turtles. Due to the size of the hedgehogs, the risk of entrapment would be greatest for female nesting sea turtles and foraging sea turtles. Although the placement of hedgehogs are a potential risk to sea turtles at any water depth, those placed at

**Determination of Effects*****Sea Turtles***

the 1.3-m depth pose a greater risk of entrapment since there would be little or no clearance over the structures in the water column. Additionally, many turtles found at this water depth will likely be females coming ashore to nest. Turtles encountering these structures may become entrapped in the shallow-water structures, or may be deterred from coming ashore to nest. The concertina wire could also pose a significant threat to sea turtles if a turtle swam into the opening at one end and became trapped anywhere in the 100-m zone. Eglin Natural Resources Section determines that even though the density numbers are small, if a sea turtle was in the proposed area of interest, it would likely be adversely affected by the objects in the water.

Hatchlings may encounter hedgehogs while entering the water and beginning their offshore migration; however, due to their size, construction, and spacing between hedgehogs, the risk of entrapment and interruption of the offshore swimming is not considered a major threat to hatchlings.

Other species considered include marine mammals such as the bottlenose dolphin. After discussion with the NMFS, entanglement and entrapment seem highly unlikely in the surf zone for marine mammals, especially since the objects will only be in the water for one to two weeks at a time.

In addition, direct impacts to any of the species (sea turtles, marine mammals, and Gulf sturgeon) would be minimized by visual clearance procedures. One vessel with trained marine mammal observers would conduct pre- and postmission monitoring for marine mammals. Although 25 percent of missions would take place at night where monitoring is not feasible, monitoring would be performed in the morning and afternoons. If any are sighted during testing, the mission would be delayed until the animal has moved outside of the testing area.

***Avoidance and Minimization Measures***

Some project modifications and mitigations may reduce the risk of any potential adverse affects on sea turtles and would, therefore, be implemented for this type of testing.

- The floats used to mark the boundary of the test area and those serving as targets in the water column would be checked daily when in the water.
- Daily surveys would be conducted in the project area to ensure no protected species are present when tests are being conducted.
- All submerged objects would be checked daily.
- When possible, tests would be conducted at times of year that reduce the potential impact to sea turtles.

**4.2 GULF STURGEON**

Little is known about sturgeon use of the Gulf of Mexico. Most subadult and adult Gulf sturgeon spend cool months (October or November through March or April) in estuarine areas, bays, or in the Gulf of Mexico (Odenkirk, 1989; Foster, 1993; Clugston et al., 1995; and Fox et al., 2002). In the spring (March to May), most adult and subadult Gulf sturgeon return to their natal rivers

**Determination of Effects****Gulf Sturgeon**

where the population spends until October or November (six to eight months) (Odenkirk, 1989; Foster, 1993; Clugston et al., 1995; and Fox et al., 2000).

If the Proposed Action takes place between March and October, Gulf sturgeon would not likely be present in the Gulf of Mexico at this time. Therefore, between March and October, Eglin believes the Proposed Action would have no effect on the Gulf sturgeon.

If the Proposed Action takes place between November and March, a potential for injury or mortality to the Gulf sturgeon exists, though species numbers in the Gulf of Mexico cannot be estimated and no fish have been found in the area. Radio monitoring in the Gulf of Mexico approximately 1 mile offshore SRI on 18 January 1998 recorded no radio-tagged fish. ALRT missions would include inert mines in the water (M20 inert antitank [AT], PDM-1M inert antilanding [AL] craft, PDM-2 inert AL mines), obstacles (floats and buoys, scientific instrumentation, tetrahedrons, hedgehogs, concrete cubes ( $4 \times 4 \times 4$ ) and barricades (concertina wire or wire rolls, sea urchins). However, none of these would be placed further than 30 meters offshore. All of the mines, obstacles, and barricades used in ALRT testing would be placed in waters no deeper than 3 meters. Data collected from USFWS during the winter of 1999 showed that sturgeon appear to use waters that are deeper than those found within the proposed project area, though data are insufficient to rule out the possibility that sturgeon could use the nearshore water.

Thus, there is a small, but unlikely, chance that Gulf sturgeon could be directly impacted by the mines, obstacles, and barricades in the water through entrapment or entanglement, but the potential for direct physical impacts is considered remote. The insertion of these devices around the edge of the target field (either anchored to screw anchors or to poles jetted into the sand) and entanglement through the concertina wire and/or tanglefoot could result in physical contact with this species. The probability that a sturgeon would be present at the time and location of the placement of the devices is low. In addition, the disturbance and noise associated with putting equipment in place would likely cause any sturgeon to leave the area before the commencement of activities. The concertina wire and tanglefoot are so close to the shore and in shallow water that there is little chance of sturgeon being present. Therefore, Eglin Natural Resources believes the proposed action is not likely to adversely affect the Gulf sturgeon.

**4.3 GULF STURGEON CRITICAL HABITAT**

Among the seven primary constituent elements as defined in the 2003 Federal Register, three (numbers 2, 3, and 4) refer to riverine areas and are, therefore, not applicable to this BA based on the location of the Proposed Action. The applicable primary constituent elements are discussed below.

**4.3.1 Suitable Food Items (Primary Constituent Element 1)**

It is probable that the substrate in the vicinity of the proposed action supports at least some prey items preferred by subadult and adult Gulf sturgeons (i.e., mole crabs, sand fleas, various amphipod species, and lancelets). However, the occurrence of these species at the proposed site would be incidental. Due to the short nature of this mission, loss of benthic prey species as a

**Determination of Effects****Gulf Sturgeon Critical Habitat**

result of ALRT activities would be small and temporary, and recolonization would be expected within a short time.

**4.3.2 Water Quality (Primary Constituent Element 5)**

The placement and removal of the mines, barricades, and obstacles (either anchored to screw anchors or to poles jettied into the sand) on the Gulf of Mexico floor would result in turbidity due to the disturbance of bottom sediments. However, the disturbance would be local and temporary and would not result in significant or long-term effects to the water column.

**4.3.3 Sediment Quality (Primary Constituent Element 6)**

As discussed above, sediment would be displaced by insertion of the mines, barricades, and obstacles. However, the amount of sediment impacted would be small compared to the amount of comparable habitat available in the nearby area and in the Gulf of Mexico overall. The Proposed Action would not change the composition, characteristics, or functions of the sediment.

**4.3.4 Migratory Pathways (Primary Constituent Element 7)**

The mines, obstacles, and barricades would be placed on the Gulf of Mexico floor for 100 meters in length and no more than 30 meters from the shoreline. Such a configuration is not expected to affect the ability of Gulf sturgeon to migrate between riverine, estuarine, and marine habitats. The temporary placement of the devices associated with the Proposed Action would not significantly alter water flow or migratory behavior of the species.

**4.3.5 Summary of Effects to Gulf Sturgeon Critical Habitat**

The Proposed Action would not appreciably affect the availability of prey items taken by the Gulf sturgeon. Placement and removal of the mines, barricades, and obstacles through anchoring to screw anchors or to poles jettied into the sand would cause only local and temporary turbidity. The area of habitat affected is very small relative to the area of similar habitats available in the Gulf of Mexico, and the temporary placement of the devices would not impede the migration of the species. Therefore, Eglin NRS believes the Proposed Action is **not likely to adversely modify** critical habitat for the Gulf sturgeon.

**4.4 ESSENTIAL FISH HABITAT**

The Magnuson-Stevens Fishery Conservation and Management Act requires federal agencies to assess potential impacts to EFH for commercial fisheries managed by the NMFS. An EFH is described as those waters and substrate necessary for fish spawning, feeding, or growth to maturity. Adverse impacts to EFH have been further defined as those that reduce quality and/or quantity of EFH. The ALRT missions have been analyzed and include potential consequences resulting from the temporary placement of mines, obstacles, and barricades on the Gulf of Mexico floor.

The proposed ALRT testing would be designed and sited to avoid and minimize impact to EFH and federally managed species. The test area chosen for this mission should avoid sensitive habitats such as seagrass beds, oyster reefs, and hardbottom habitat. However, some unavoidable

**Determination of Effects****Essential Fish Habitat**

adverse impacts on EFH would occur. Placement of the mines, barricades, and obstacles onto the bottom of the Gulf of Mexico would temporarily affect the fine, medium-grained sand habitat, which may include EFH for some of the species listed above. However, the area of sandy bottom affected by the proposed project is small compared to the area of other suitable habitats available to these species in the vicinity of the Proposed Action. These temporary disturbances may also have indirect effects on federally managed species through the loss of benthic prey species found in the unvegetated bottom habitats. Most of these prey species, however, are expected to recolonize the affected area. In addition, the organisms and habitats in an open water habitat, such as the Gulf of Mexico, are less likely to be adversely impacted than shallow-water environments such as estuaries.

Placement of the mines, barricades, and obstacles either anchored to screw anchors or to poles jetted into the sand are likely to resuspend sediments, temporarily increasing turbidity in the marine water column. These elevated levels of suspended sediment could have adverse effects on federally managed fish species, including avoidance of the impact area, minor physiological effects (such as interference with respiratory functions), and indirect effects related to reduced light penetration into the water. The sediments suspended by the Proposed Action are expected to settle within or near the impact area shortly after ALRT testing is complete (one to two weeks), resulting in only minor, temporary impacts to EFH or federally managed species.

The placement and removal of the mines, barricades, and obstacles would also disturb a small but insignificant area of sea floor. To alleviate any potential impacts to protected habitat, hardbottom habitats and artificial reefs will be avoided when placing the objects on the floor of the Gulf of Mexico. Hardbottom is rocky, limestone, or coral outcroppings that, though scattered, do exist within or near the affected environment.

**4.4.1 Seagrasses**

No seagrass beds are located on the Gulf or the sound side of Santa Rosa Island in the proposed area of interest.

**4.4.2 Artificial Reefs**

Artificial reefs exist offshore of Test Area A-4. However, these reefs are over a mile out and are not located near any of the proposed surf zone test areas or landing areas. Therefore, the proposed activities conducted at Santa Rosa Island are not likely to adversely impact essential fish habitat. To alleviate any potential impacts to artificial reefs, they would be avoided.

**4.4.3 Conclusion**

ALRT missions are **not likely to adversely modify** essential fish habitat.

**Determination of Effects*****Summary of Conclusions and Recommendations*****4.5 SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS**

Based on the analysis in Section 4.1, sea turtles are likely to be adversely affected by entanglement and entrapment caused by certain objects in the water, although the chances of this occurring are very small. Adherence to proper avoidance and minimization measures can greatly reduce the potential for adverse impacts to sea turtle populations.

ALRT tests would have no effect on Gulf sturgeon if executed between March and October, since Gulf sturgeon would be in their natal rivers, not in the Gulf of Mexico, during this time frame. If the mission takes place between November and March, ALRT tests are not likely to adversely affect the Gulf sturgeon. No sturgeon have been recorded in the area of interest and studies show sturgeon appear to use waters that are deeper than those found within the proposed project area. ALRT testing is not likely to adversely modify Gulf sturgeon critical habitat.

Hardbottom habitats and artificial reefs would be avoided to alleviate any potential impacts to protected habitat. ALRT tests are not likely to adversely modify EFH.

The NMFS would be notified immediately if any of the actions considered in this biological assessment were modified or if additional information on listed species became available, as a reinitiation of consultation may be required. If impacts to listed species occurred beyond what has been considered in this assessment, all operations would cease and the NMFS would be notified. Any modifications or conditions resulting from consultation with the NMFS would be implemented prior to commencement of activities. The Natural Resources Section believes this fulfills all requirements of Section 7 of the Endangered Species Act and no further action is necessary.

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**Review of Literature and Other Pertinent Information****6. REVIEW OF LITERATURE AND OTHER PERTINENT INFORMATION**

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DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS 96TH AIR BASE WING (AFMC)  
EGLIN AIR FORCE BASE FLORIDA

Mr. Stephen M. Seiber  
Chief, Natural Resources Section  
501 De Leon Street, Suite 101  
Eglin AFB FL 32542-5133

80 SEP 2007

Mr. Mark Thompson  
Team Leader, National Marine Fisheries Service  
3500 Delwood Beach Rd.  
Panama City Beach FL 32408

Dear Mr. Thompson

The attached Biological Assessment (BA) is being submitted to fulfill Essential Fish Habitat Assessment requirements under the Magnuson-Stevens Fishery Conservation and Management Act. This BA assesses potential impacts to Gulf sturgeon, critical habitat of the Gulf sturgeon, sea turtles, and essential fish habitat within the estuarine waters of Florida, associated with Eglin Gulf Test and Training Range (EGTTR) Advanced Littoral Reconnaissance Technologies (ALRT) testing at Eglin Air Force Base (AFB), Florida.

The U.S. Air Force requests that you review the information provided and, if appropriate, provide written concurrence with our determination. If you have any questions regarding this letter or any of the proposed activities, please do not hesitate to contact either Mr. Bob Miller (850) 883-1153 or myself at (850) 882-8391.

Sincerely

STEPHEN M. SEIBER, YF-2  
Chief, Natural Resources Section

Attachment:  
Biological Assessment

cc:  
David Bernhart, National Marine Fisheries Service  
Assistant Regional Administrator  
Protected Resources Division



DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS 96TH AIR BASE WING (AFMC)  
EGLIN AIR FORCE BASE FLORIDA

Mr. Stephen M. Seiber  
Chief, Eglin Natural Resources Section  
501 De Leon Street, Suite 101  
Eglin AFB FL 32542-5133

20 SEP 2007

Mr. Steve Leathery  
Office of Protected Resources  
National Marine Fisheries Service (NMFS)  
1315 East-West Highway  
Silver Spring, MD 20910-3226

Dear Mr. Leathery

This submittal is a formal request from Eglin Air Force Base (AFB) for a Letter of Concurrence (LOC). Eglin Natural Resources Section believes there would be no take of marine mammals from Advanced Littoral Reconnaissance Technologies (ALRT) projects per personal communication between Mike Nunley and Shane Guan from the National Marine Fisheries Service. The Proposed Action would involve the collection of both passive and active multispectral seeker/sensor signature data of obstacles, simulated mines, and barricades in inland environments and littoral waters from several possible systems and airframes.

Eglin has initiated formal consultation with the NMFS South East Regional Office (SERO) to fulfill requirements under Section 7 of the Endangered Species Act (ESA). A copy of the ALRT Biological Assessment (BA) has also been included as an attachment for your review. With this submittal, Eglin AFB requests a LOC to make certain the Air Force is covered under the Marine Mammal Protection Act (MMPA). Because in-place mitigations would clear the area of any marine mammals daily and the area is not good habitat for marine mammals, it is anticipated that no federally protected marine mammal takes would result. The National Marine Fisheries Service will be notified immediately if any of the considered actions are further modified or if additional information on marine mammal species becomes available.

If you have any questions regarding this letter or any of the proposed activities or analyses, please do not hesitate to contact either Mr. Bob Miller or myself at (850) 882-4164.

Sincerely

STEPHEN M. SEIBER, YF-2  
Chief, Natural Resources Section

Attachments:

1. ALRT Request for Letter of Concurrence
2. ALRT NMFS Biological Assessment, September 2007
3. ALRT USFWS Biological Opinion, June 2004

CC:

David Bernhart  
Assistant Regional Administrator  
Protected Resources Division  
National Marine Fisheries Service (NMFS)  
Southeast Regional Office  
263 13<sup>th</sup> Avenue S  
St. Petersburg, FL 33701



**UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE**

Southeast Regional Office  
263 13th Avenue South  
St. Petersburg, Florida 33701  
(727) 824-5317; FAX 824-5300  
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October 31, 2007 F/SER46:MT/mt

Mr. Stephen M. Seiber, YF-2  
Chief, Natural Resources Section  
U.S Air Force  
501 De Leon Street, Suite 101  
Eglin AFB FL 32542-5133

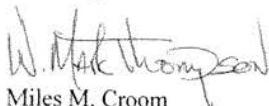
Dear Mr. Seiber:

NOAA's National Marine Fisheries Service (NMFS), Habitat Conservation Division, has received your letter dated September 20, 2007, initiating essential fish habitat (EFH) consultation and providing an EFH Assessment for the Advanced Littoral Reconnaissance Technologies (ALRT) testing at Eglin Air Force Base and in the Gulf of Mexico, Santa Rosa County, Florida. This request was initiated pursuant to the consultation provisions of the Magnuson-Stevens Conservation and Management Act (Magnuson-Stevens Act).

As stated in your staff's email dated September 27, 2007, the U.S. Air Force states that the testing associated with ALRT would not adversely affect EFH. Based on the information provided in the EFH Assessment, the NMFS concurs and does not have any EFH conservation recommendations to offer.

Thank you for your effort to comply with the EFH provisions of the Magnuson-Stevens Act.

Sincerely,

  
for  
Miles M. Croom  
Assistant Regional Administrator  
Habitat Conservation Division

cc:  
F/SER4  
F/SER3





**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
**PROGRAM PLANNING AND INTEGRATION**  
 Silver Spring, Maryland 20910

NOV 26 2007

Mr. Stephen M. Seiber  
 Chief, Eglin Natural Resources Section  
 501 De Leon Street, Suite 101  
 Eglin AFB, Florida 32542-5133

Dear Mr. Seiber:

The National Marine Fisheries Service (NMFS) has received your request for a Letter of Concurrence (LOC) documenting that the taking of marine mammals is not likely to occur, and, therefore, an Incidental Harassment Authorization (IHA) is not necessary pursuant to the Marine Mammal Protection Act (MMPA), for the Advanced Littoral Reconnaissance Technologies (ALRT) project on Santa Rosa Island in Florida. Each proposed testing series for the project is expected to occur for no longer than a two week period (day/night), three to five times per year. It has been acknowledged that Eglin AFB has initiated formal consultation with the NMFS Southeast Regional Office (SERO) to fulfill requirements under Section 7 of the Endangered Species Act (ESA). For questions or concerns regarding the ESA or its requirements, please contact Kyle Baker at the NMFS SERO, at (727) 824-5312.

The purpose of the proposed work is to collect both passive and active multispectral seeker/sensor signature data of obstacles, simulated mines, and barricades in inland environments and littoral waters (up to 13 ft/4 m deep and 100 ft/30 m offshore) from several possible systems (laser and camera) and airframes (helicopters and fixed-wing aircraft) in order to simulate the terrain in a realistic threat scenario. The various structures will be strategically placed along the beach and inland areas, as well as a separate specified marine area that covers from the shoreline to a depth of 13 ft (4 m) in the water over an area 328 ft (100 m) wide. The structures and devices in the water will be deployed and recovered using a boat/barge. The project will be using passive camera-like receivers and active laser illuminators from both the ground and aircraft, such as helicopters and fixed-wing planes at various altitudes (500-3000 ft (152-914 m)). The testing is required to evaluate the effectiveness of the various sensors, in the littoral and surf-zone environment.



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Since the obstacle/barrier-like structures deployed along or near the coastal areas are immobile and passive, Eglin AFB believes that there will not be a taking of protected marine mammal species by acoustic harassment or entanglement as a result of the proposed ALRT project. Nonetheless, as a precaution, Eglin AFB proposes to implement the following mitigation and monitoring measures to ensure that no takes of marine mammals would occur due to the proposed exercise activities:

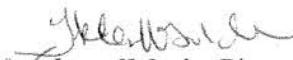
- 1) During daylight conditions in the morning and afternoon, trained Marine Mammal Observers (MMOs) will conduct monitoring before and after each mission for marine mammals. If any marine mammal were visually detected within the project area, the mission would be postponed. The delay would continue until the marine mammal that caused the postponement is confirmed to be outside of the project area due to the animals swimming out of the range;
- 2) For aircraft (helicopters and fixed-wing planes) operations at night below an altitude of 1000 ft (305 m), MMOs will monitor the area of action with the use of night-vision goggles during the limited flight passes;
- 3) Hard-bottom habitats and artificial reefs would be avoided to alleviate any potential impacts to protected habitat; and
- 4) During daily checks and cleaning of the submerged object targets, divers and topside personnel would survey the area for protected marine species.

Avoidance of impacts to schools of cetaceans would most likely be realized through these measures, since groups of dolphins are relatively easy to visually sight with the survey distances and methods that would be in use.

The bottlenose dolphin (*Tursiops truncatus*) is the only marine mammal species that is expected to be found in the vicinity of the proposed project area, and it has been seen in only small numbers. A brief description of this species is provided in the attachment.

NMFS believes that if the aforementioned mitigation and monitoring measures are implemented, takes of marine mammals are not likely to occur, and an IHA is not necessary pursuant to section 101(a)(5)(D) of the MMPA. If for any reason Eglin AFB does not implement these voluntary mitigation and monitoring measures, NMFS' concurrence with Eglin AFB's determination would lapse. At such time, NMFS would recommend that Eglin AFB apply for an IHA under section 101 (a)(5)(D) of the MMPA. This same recommendation would apply if Eglin AFB subsequently obtains information during the activity that indicates that marine mammals may be disturbed by the proposed activities. For additional information on this action, please contact Howard Goldstein at (301) 713-2289 ext. 172.

Sincerely,



James H. Lecky, Director  
Office of Protected Resources  
National Marine Fisheries Service

Attachment

**Attachment****Marine Mammal Species/Stocks in the Proposed Action Area****Bottlenose Dolphin (*Tursiops truncatus*): Gulf of Mexico Bay, Sound, and Estuarine Stocks**

In the Gulf of Mexico, there are thirty-eight stocks of bottlenose dolphins (Waring et al. 2001) and two recognized ecotypes, “coastal/nearshore” and “offshore” (Hersh and Duffield 1990). The inshore habitat distribution of the “coastal/nearshore” ecotype in the Gulf of Mexico is very complicated due to the variability of behavior and has been separated into 33 bay, sound and estuarine stocks (Shane et al. 1986; Wells and Scott 1999; Wells 2003). These genetically distinct animals may be distributed and range from the shore to the 20 m isobath in resident “communities” along the wide continental shelf (Wells et al. 1987; Torres et al 2003). The “offshore” ecotype is found seaward of the 200 m isobath. Coastal/nearshore dolphins possibly migrate in and out of bays, sounds and estuaries based on seasons. Changes in abundance have been geographically documented with increases northerly and into coastal waters during the spring/summer and southerly and into inshore waters during the fall/winter (Irvine et al 1981; Maze and Wursig 1999), however uncertainty does remain. The current population size estimates for the coastal/nearshore stock is considered unknown due to outdated (older than 8 years) and insufficient aerial and line-transect survey data (Wase and Angliss 1997). The previous (1993) best abundance estimate of bottlenose dolphins in the nearby Choctawhatchee Bay is 242, with an approximated minimum population of 188. The Gulf of Mexico Bay, Sound and Estuarine stock is not listed as threatened or endangered under the ESA, but is considered strategic under the MMPA.



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
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MAY 20 2008

F/SER32:KPB

Mr. Stephen M. Seiber, Chief  
 Natural Resources Section  
 501 De Leon Street, Suite 101  
 Eglin Air Force Base, FL 32542-5133

Dear Mr. Seiber:

The enclosed document constitutes the National Marine Fisheries Service's (NMFS) biological opinion (opinion) based on our review of the request from Eglin Air Force Base (AFB) for formal Endangered Species Act (ESA) section 7 consultation on the effects of the Advanced Littoral Reconnaissance Technologies (ALRT) testing at Eglin AFB, Florida. Our opinion concludes that the ALRT testing and its associated actions occurring from the time of this opinion until the year 2020 are not likely to jeopardize the continued existence of threatened or endangered species under the jurisdiction of NMFS, or destroy or adversely modify designated critical habitat. However, NMFS anticipates incidental take of sea turtle species and has issued an Incidental Take Statement (ITS) pursuant to section 7 of the ESA. This ITS contains reasonable and prudent measures with implementing terms and conditions to help minimize the impacts of this take.

We look forward to the continued cooperation with Eglin AFB to ensure the conservation of our threatened and endangered marine species and designated critical habitat. We have also enclosed other statutory requirements that may apply to this action, as well as additional information on NMFS' Public Consultation Tracking System to allow you to track the status of ESA consultations. If you have any questions, please contact Kyle Baker, fishery biologist, at (727) 824-5312, or by e-mail at [kyle.baker@noaa.gov](mailto:kyle.baker@noaa.gov).

Sincerely,

Roy E. Crabtree, Ph.D.  
 Regional Administrator

Enclosures

File: 1514-22.S  
 Ref: F/SER/2007/07557



## Additional Considerations for ESA Section 7 Consultations (Revised 01-18-2008)

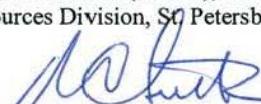
**Marine Mammal Protection Act (MMPA) Recommendations:** The Endangered Species Act (ESA) section 7 process does not authorize incidental takes of listed or non-listed marine mammals. If such takes may occur an incidental take authorization under MMPA section 101 (a)(5) is necessary. Contact Ken Hollingshead of our NMFS Headquarters' Protected Resources staff at (301) 713-2323 for more information on MMPA permitting procedures.

**Essential Fish Habitat (EFH) Recommendations:** In addition to its protected species/critical habitat consultation requirements with NMFS' Protected Resources Division (PRD) pursuant to section 7 of the ESA, prior to proceeding with the proposed action the action agency must also consult with NMFS' Habitat Conservation Division (HCD) pursuant to the Magnuson-Stevens Fishery Conservation and Management Act's (MSA) requirements for essential fish habitat (EFH) consultation (16 U.S.C. 1855 (b)(2) and 50 CFR 600.905-.930, subpart K). The action agency should also ensure that the applicant understands the ESA and EFH processes; that ESA and EFH consultations are separate, distinct, and guided by different statutes, goals, and time lines for responding to the action agency; and that the action agency will (and the applicant may) receive separate consultation correspondence on NMFS letterhead from HCD regarding their concerns and/or finalizing EFH consultation.

**Public Consultation Tracking System (PCTS) Guidance:** PCTS is an online query system allowing federal agencies and U.S. Army Corps of Engineers' (COE) permit applicants to track the status of NMFS consultations under ESA section 7 and under MSA sections 305(b)(2) and 305(b)(4): Essential Fish Habitat. Access PCTS via: [www.nmfs.noaa.gov/pcts](http://www.nmfs.noaa.gov/pcts). Federal agencies are required to enter an agency-specific username and password to query the Federal Agency Site. The Corps Permit Site allows COE permit applicants the ability to check on the current status of Clean Water Act section 404 permit actions for which NMFS has conducted an ESA section 7 consultation with the COE since the beginning of the 2001 fiscal year (no password needed).

For COE-permitted projects, click on "Enter Corps Permit Site." From the "Choose Agency Subdivision (Required)" list, pick the appropriate COE district. At "Enter Agency Permit Number" type in the COE district identifier, hyphen, year, hyphen, number. The COE is in the processing of converting its permit application database to PCTS-compatible "ORM." An example permit number is: SAJ-2005-000001234-IPS-1. For the Jacksonville District, which has already converted to ORM, permit application numbers should be entered as SAJ (hyphen), followed by 4-digit year (hyphen), followed by permit application numeric identifier with no preceding zeros. E.g., SAJ-2005-123, SAJ-2005-1234, SAJ-2005-12345.

For inquiries regarding applications processed by Corps districts that have not yet made the conversion to ORM (e.g., Mobile District), enter the 9-digit numeric identifier, or convert the existing COE-assigned application number to 9 numeric digits by deleting all letters, hyphens, and commas; converting the year to 4-digit format (e.g., -04 to 2004); and adding additional zeros in front of the numeric identifier to make a total of 9 numeric digits. E.g., AL05-982-F converts to 200500982; MS05-04401-A converts to 200504401. PCTS questions should be directed to Eric Hawk at [Eric.Hawk@noaa.gov](mailto:Eric.Hawk@noaa.gov). Requests for username and password should be directed to [PCTS.Usersupport@noaa.gov](mailto:PCTS.Usersupport@noaa.gov).

**ENDANGERED SPECIES ACT – SECTION 7 CONSULTATION  
BIOLOGICAL OPINION****Action Agency:** U.S. Department of the Air Force, Eglin Air Force Base**Activity:** Advanced Littoral Reconnaissance Technologies Testing (Consultation Number F/SER/2007/07557)**Consulting Agency:** National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS), Southeast Regional Office, Protected Resources Division, St. Petersburg, Florida**Approved By:**  
Roy E. Crabtree, Ph.D., Regional Administrator  
NMFS, Southeast Regional Office  
St. Petersburg, Florida**Date Issued:** MAY 20 2008

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**Background**

Section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. § 1531 *et seq.*), requires that each federal agency shall ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species; section 7(a)(2) requires federal agencies to consult with the appropriate Secretary on any such action. NMFS and the U.S. Fish and Wildlife Service (USFWS) share responsibilities for administering the ESA.

Consultation is required when a federal action agency determines that a proposed action “may affect” listed species or designated critical habitat. Consultation is concluded after NMFS determines that the action is not likely to adversely affect listed species or critical habitat or issues a biological opinion (opinion) that identifies whether a proposed action is likely to jeopardize the continued existence of a listed species, or destroy or adversely modify critical habitat. An opinion states the amount or extent of incidental take of the listed species that may occur, develops measures (i.e., reasonable and prudent measures - RPMs) to reduce the effect of take, and recommends conservation measures to further conserve the species. Notably, no incidental destruction or adverse modification of critical habitat can be authorized, and thus there are no reasonable and prudent measures, only reasonable and prudent alternatives that must avoid destruction or adverse modification.

This document represents NMFS’ opinion based on our review of impacts associated with the proposed Advanced Littoral Reconnaissance Technologies (ALRT) testing at Eglin Air Force Base (Eglin AFB).

This opinion analyzes project effects on loggerhead, Kemp's ridley, leatherback, and green sea turtles; smalltooth sawfish; Gulf sturgeon; and Gulf sturgeon critical habitat units 11 and 12 in accordance with section 7 of the ESA, and is based on project information provided by Eglin AFB and other sources of information including the published literature cited herein.

## BIOLOGICAL OPINION

### 1 CONSULTATION HISTORY

NMFS provided technical assistance to Eglin AFB on ALRT on April 26, 2007. Eglin prepared a biological Assessment (BA) on ALRT dated September 20, 2007. NMFS requested additional information regarding project details in an October 26, 2007 letter. On November 27, 2007, NMFS received a response from Eglin AFB in a letter dated November 16, 2007. Formal consultation was initiated by NMFS on January 2, 2008.

The USFWS previously analyzed the effects of ALRT activities (USFWS 2004) in a biological opinion, specifically, the potential for sea turtle takes associated with ALRT activities on the beach. Although the description of the proposed action and action area in NMFS' biological opinion includes the beach environment, our effects analysis considers only the aquatic portion of the proposed action. The incidental take statement of the USFWS opinion on this activity issued on June 4, 2004, is considered further in the environmental baseline of this opinion.

### 2 DESCRIPTION OF THE PROPOSED ACTION AND ACTION AREA

#### 2.1 Proposed Action

The proposed ALRT tests would collect signature data using both passive and active multi-spectral seeker/sensor technologies on obstacles, simulated mines, and barricades in inland environments and littoral waters deployed from several possible systems and airframes. Targets would be placed in the littoral zone for detection during aerial training missions. Sensor equipment would consist of passive multi-spectral receivers collecting imagery just as a video camera would, but some missions will actively employ lasers to detect and receive data. Simulated mines, barriers, and obstacles would be set up on beach and inland areas, as well as in a separate specified marine area extending from the shore to waters as deep as 4 m over an area 100 m wide. Aircraft would land to refuel, download data, check systems, and tie down for the night as required.

##### *System and Flight Description*

During each one- to two-week testing series, multiple data-collection flights would be conducted (typically two flights per day). The standard aircraft used for the tests, a Bell UH-1 "Huey," would fly to the test area to collect data. Flights would occur both day and night, with approximately 25 percent of missions occurring at night between the hours of 2100 and midnight. Altitudes would range from 152 m to 914 m for each sortie, with typical speeds from 35 to 70 knots. Aircrew would fly clover leaf, racetrack, and/or parallel tracks as needed to optimize data collection. Other aircraft such as small fixed-winged planes may also be used.

The typical system would consist of the imaging sensor, optical illuminator image recording hardware, navigation tracking software, mechanical cooling equipment for the illuminator, and aircraft. Cameras would record images of the target field.

*Frequency and Duration of Tests*

Targets would be placed in the waters of the GOM (in particular the surf zone area) from shore out to 4-m depths. Each test series would last one to two weeks. Personnel would set up the target field over three to four days, the mission flights would commence, and then personnel would remove the targets from the test site over two to three days. ALRT missions are proposed to occur four to five times per year until the year 2020.

A typical timeline for each ALRT test involves:

- Three to four days: target set up and mission preparation;
- Four to six days: conduct mission flights;
- Two to four days: weather backup;
- Two to three days: target removal and cleanup

*Minefield, Barrier, and Obstacle Layouts*

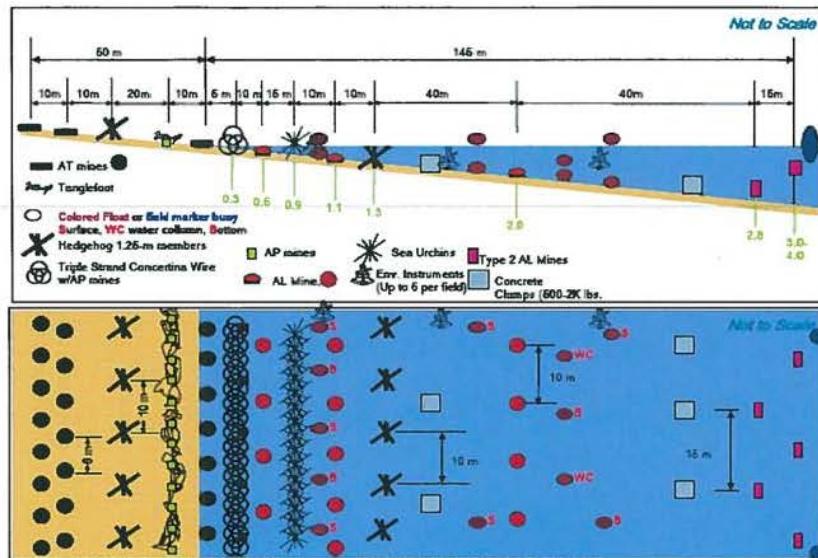
Activities associated with testing include placement of inert mines and obstacles (such as concrete blocks and concertina wire) on the beachfront. Inert M20 antitank mines, inert PDM-1M antitank/antilanding craft mines, or 35.5-cm diameter mines would be used in the surf zone at 0.5-m depths.

The minefield, barrier, and obstacle layouts required for this test include linear patterned and random scattered mines, barriers, and obstacles on the beach and in the water (Figure 1). Eglin personnel would place inert mines in each area to simulate actual mine layouts. To minimize the movement or loss of mines, each individual target would be anchored, tied together, inventoried, and monitored for proper setup. The type of anchors used will be 11.3 kg to 34 kg boat anchors and iron weights. These devices would be positioned near the edge of the water or in the water up to 4 m deep and anchored primarily with screw anchors or, occasionally, poles jetted into the sand. To raise and lower some of the heavier targets, a boat/barge with equipment would be necessary. A scuba diver would then secure each mine with a screw anchor.

Mine positions would be recorded using a hand-held differential GPS system at the time of installation in the target field. Personnel would record this "truth data" on the minefield layout chart and use it to score the actual data results to determine horizontal location accuracy. For reference, areas of Test Site A-15 to be flown over would be marked on the perimeter with  $1.22 \text{ m}^2$  painted aluminum panels and/or small lights (pointed upward). These panels and lights would remain in place throughout the flight series. For night operations, strobe lights would be set up to direct the flight paths accordingly.

The inert mines would include M20 inert antitank, PDM-1M inert antilanding craft, and PDM-2 inert antilanding mines. Obstacles would include floats and buoys, scientific instrumentation, tetrahedrons, structural hedgehogs, and concrete cubes 1.2 m  $\times$  1.2 m  $\times$  1.2 m. Barricades would include concertina wire or wire rolls that could simulate concertina wire, tanglefoot barbed wire

fencing, and structural sea urchins, which are three pieces of steel rebar welded in the shape of a teepee.



**Figure 1.** The proposed layout of mines and obstacles to be used in the test field.

#### Description of the Target Field

Targets would be placed in the surf zone. The obstacles and barricades would be no longer than 100 m; however, M20 inert antitank mines may be scattered around the other items but would be located within the potential placement locations. Similar barricades or obstacles may be used both in the surf zone and on the beach. The entire area would never be totally filled; only various small sections of the total area would have typical minefield layouts at any given time. There would not be more items emplaced than current inventory allotments allow. Those inventories consist of up to 1,000 mine-like objects varying in diameter from a few centimeters up to 36 in and other targets such as buoys varying in size up to 0.9 m, marker panels typically 1.2 m x 1.2 m, various wire obstacles, various light-to-medium antilanding obstacles, and various instrumentation for monitoring the environment. The types of objects proposed for placement in the ALRT test field include:

- floats and lights to mark the boundary of the test field area and floats throughout the target field area to serve as additional targets;
- water quality measurement instrumentation positioned on a tall screw anchor (four total);

- type 2 inert antilanding craft mines at 2- to 3-m depths and spaced 15 m apart;
- structural hedgehogs ( $1\text{ m} \times 1\text{ m} \times 1\text{ m}$ ) in approximately 1.3-m depth with 10-m spacing;
- structural sea urchins (2 m tall) in 0.9-m depth and 100 m long;
- concertina wire or wire rolls manufactured to simulate concertina wire in 0.3 m of water and 100 m long;
- antilanding craft mines in the water, in particular at 0.6-m, 1.1-m, and 2-m depths at 6 to 10 m apart;
- a tangle-foot barbed wire array 10 m from the water edge;
- additional row of structural hedgehogs measuring  $1\text{ m} \times 1\text{ m} \times 1\text{ m}$  structural hedgehogs 30 m from the water edge;
- a row of antitank mines buried in the sand by hand, and
- a trailer on the beach to capture data from devices located in the water that collect water-clarity information. These devices would be positioned around the edge of the target field and would need to be anchored to screw anchors or to poles jetted into the sand in water as deep as 3 m deep.

After the objects are put into place, a hand-held GPS would be used to locate the objects by either walking into the water or using a kayak to float out. Also, divers would check the targets daily to verify that the objects are there and clean them off. During these daily checks, divers would survey the area for protected marine species. Either reflective or lighted buoys would be placed approximately 50 m away from the perimeter of the test area, notifying boats of restricted access to the area. During the test mission, a Navy/Air Force boat would be present in the water to intercept and warn other boats approaching the test area. As soon as the last flight test is complete, personnel would remove all of the mines, obstacles, and barricades and account for their locations.

## **2.2 Proposed Harm Avoidance and Minimization Measures**

To minimize impacts to sea turtles and other sensitive SRI species, the avoidance and minimization measures below are proposed by Eglin AFB. Sea turtle nesting season at Eglin AFB is 1 May to 31 October.

- When possible, tests would be conducted outside the sea turtle nesting season.
- If any portion of the ALRT testing occurs during the period from 1 May through October 31, the Natural Resources Section (NRS) will conduct daily early morning sea turtle surveys. Nesting surveys in the test area will begin 70 days prior to ALRT

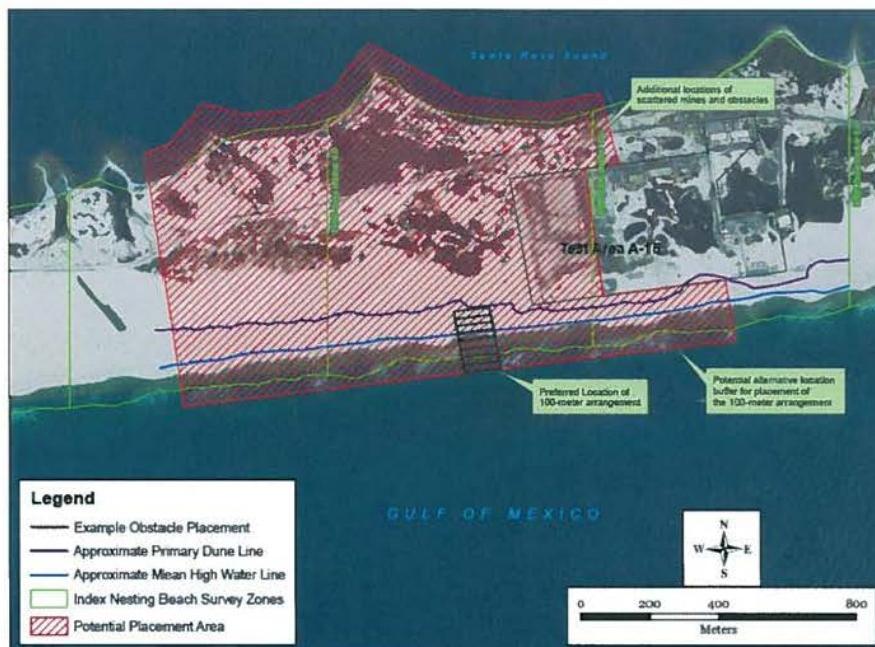
activities, or by May 1, whichever is later. Nesting surveys will continue through the end of the activities or through September 1, whichever is earlier. After this period, the NRS will continue to check nests based on anticipated hatching dates.

- The NRS will relocate all sea turtle nests in the test area to adjacent beaches at least 15.2 m from the boundaries of the test site. All nests will be relocated between INBS marker 3.5 and 4.5 if testing is conducted during the nesting season. Nest relocations associated with the ALRT project will cease when project activities no longer threaten nests.
- During sea turtle season, ALRT personnel will install a fence (e.g., silt fence) to direct sea turtles away from the common and simulated concertina wire, structural sea urchins, and tanglefoot wire on the beach and to adjacent beaches. This silt fence will serve to minimize but not eliminate potential take of nesting sea turtles.
- Surveys would be conducted in the project area to ensure no protected species are present when tests are being conducted.
- On the nights that ALRT activities will be conducted, the NRS will provide location information to test participants concerning each sea turtle nest within 0.8 km of the test area that was at or past incubation day 60. Participants will avoid marked sea turtle nests by at least 15.2 m.
- On the nights that ALRT activities will be conducted, one testing participant will serve as an observer to be responsible for identifying signs of nesting or hatchling sea turtles. The observer will be responsible for assuring that the project participants do not interfere with nesting sea turtles, impede hatchling sea turtles from emerging from the nest and crawling to the Gulf of Mexico (GOM), or obscure signs of sea turtle activity.
- If an adult or hatchling sea turtle is observed on the beach while the ALRT testing was ongoing, testing will stop until the turtle has left the beach. Participants will remain as quiet as possible, allowing the turtle to continue activities. All efforts will be made not to obscure the turtle crawl or nest area.
- Between 1 May and 31 October, Eglin will provide a 24-hour contact to the test participants that will be available to respond to emergencies related to harm or injury to sea turtles and to answer questions related to endangered species and the testing activities (POC Bob Miller, 1-888-328-7351, or Bruce Hagedorn, 1-888-879-5420).
- Between May 1 and October 31, all direct lighting of the beach and nearshore waters associated with the ALRT activities will be limited to the test area. If all sea turtle nests have hatched or been evaluated within 0.8 km, this restriction will not be required.

- Between May 1 and October 31, all set-up and take-down activity associated with ALRT testing on the beach and in the surf zone will occur during daytime hours and after the morning sea turtle survey is completed.
- All participants will receive conditions and restrictions on ALRT activities. Eglin will provide an educational overview for ALRT participants in the form of a presentation to explain the requirements.
- No equipment or vehicle use will occur on or within dune habitat.
- No project participants will traverse dunes, vegetated or unvegetated, that are 1.5 m or higher.

## 2.2 Action Area

The ALRT proposes to use Test Area A-15: the Gulf coast beach area, the sound, and an intermediate area between the two coastal areas (Figure 2). The test area will be no longer than 100 m long and out to a depth of 4 m. ALRT tests are anticipated to occur in 100-m area indicated by the black rectangle on the map, but may occur anywhere in the aquatic portion of



**Figure 2.** The proposed action area indicated by the black rectangle includes the aquatic portions of the test area in the GOM and Santa Rosa Sound.

the red-hatched area. Although the proposed action may occur anywhere in this area, the dimensions of the test area will remain the same and the potential impacts the same. The USFWS has considered the effects of the action on the beach portion of the project (USFWS 2004); thus, this opinion considers the effects of the aquatic portion of the action area in GOM and Santa Rosa Sound. The Reasonable and Prudent Measures associated with the 2004 USFWS opinion appears in APPENDIX A.

### 3 STATUS OF LISTED SPECIES AND CRITICAL HABITAT

We have identified six endangered or threatened species, and designated critical habitat under the jurisdiction of NMFS that occur in the action area and which may be affected (Table 1).

**Table 1. Endangered (E) and threatened (T) species, and critical habitat in the action area.**

Common Name	Scientific Name	Status
<b>Sea Turtles</b>		
loggerhead sea turtle	<i>Caretta caretta</i>	T
green sea turtle	<i>Chelonia mydas</i>	T/E <sup>a</sup>
Kemp's ridley sea turtle	<i>Lepidochelys kempii</i>	E
leatherback sea turtle	<i>Dermochelys coriacea</i>	E
<b>Fishes</b>		
Gulf sturgeon	<i>Acipenser oxyrinchus desotoi</i>	T <sup>b</sup>
smalltooth sawfish	<i>Pristis pectinata</i>	E

<sup>a</sup>The green sea turtle Florida breeding population is listed as endangered. The species in the Atlantic is threatened throughout the rest of its range.

<sup>b</sup>Gulf sturgeon critical habitat unit 11 and unit 12 are designated in the action area.

#### 3.1 Species and Critical Habitat Not Likely to be Adversely Affected

##### *Kemp's Ridley and Leatherback Sea Turtles*

Although both Kemp's ridley and leatherback sea turtles occur near the action area, neither species is known to nest on Santa Rosa Island and are not expected to be common in the surf zone of the proposed ALRT test area. Kemp's ridley nesting occurs from April into July and is essentially limited to the beaches of the western GOM, near Rancho Nuevo in southern Tamaulipas, Mexico. Leatherbacks are widely distributed throughout the oceans of the world, and are found in waters of the Atlantic, Pacific, and Indian Oceans (Ernst and Barbour 1972). Although leatherbacks are the most pelagic of the sea turtles, they enter coastal waters on a seasonal basis to feed in areas where jellyfish are concentrated. Leatherback sea turtles feed primarily on cnidarians (medusae, siphonophores) and tunicates.

Kemp's ridley sea turtles do not nest near Santa Rosa Island or the surrounding geographic region of the action area. Little is known of the movements of the post-hatchling stage (pelagic stage) within the GOM. Studies suggest that benthic immature Kemp's ridleys stay in shallow, warm, nearshore waters and may migrate northward and eastward from beaches in Mexico and Texas until cooling waters force them offshore or southward along the Florida coast (Renaud

1995). Leatherback sea turtles do not regularly nest in the GOM; however, three nesting attempts (and two observed nest hatchings) have been documented on Santa Rosa Island during the 18 years of nesting data at Eglin AFB. Leatherback nesting is not common on Santa Rosa Island, let alone GOM beaches, and none of the nesting attempts have occurred in the proposed test area. Because the occurrence of Kemp's ridley and leatherback sea turtles are expected to be rare in the shallow, littoral zone of the action area, any potential effects to these species resulting from the proposed action are discountable.

#### *Smalltooth Sawfish*

The U.S. smalltooth sawfish distinct population segment (DPS) was listed as endangered under the ESA on April 1, 2003 (68 FR 15674). The smalltooth sawfish is the first marine fish to be listed in the United States. Critical habitat has not been designated for the U.S. DPS of smalltooth sawfish. Historically smalltooth sawfish occurred commonly in the shallow waters of the GOM and eastern seaboard up to North Carolina, and more rarely as far north as New York. The range of this species is now only known off Florida and can only be found with any regularity off the extreme southern portion of the state. Smalltooth sawfish are most common within the boundaries of the Everglades National Park and the Florida Keys, and become less common with increasing distance from this area (Simpfendorfer 2002). Encounters with neonates (young of the year), juveniles, and sexually mature sawfish indicate, however, that a reproducing population exists at least in southern Florida. Due to the scarcity of smalltooth sawfish off the Florida panhandle, the likelihood of sawfish occurring in the small area of the action area during a training mission associated with ALRT is so small it is discountable.

#### *Gulf Sturgeon*

NMFS and the USFWS listed the Gulf sturgeon as a threatened species on September 30, 1991 (56 CFR 49653). The present range of the Gulf sturgeon extends from Lake Pontchartrain and the Pearl River system in Louisiana and Mississippi east to the Suwannee River in Florida. The Gulf sturgeon is an anadromous fish; adults spawn in freshwater then migrate to feed and grow in estuarine/marine habitats. After spawning in the upper river reaches, both adult and subadult Gulf sturgeon migrate to the estuaries, bays, and the GOM and return to the coastal rivers in early spring (i.e., March through May) when river water temperatures range from 16°C to 23°C (Huff 1975, Carr 1983, Wooley and Crateau 1985, Odenkirk 1989, Clugston et al. 1995, Foster and Clugston 1997, Fox and Hightower 1998, Sulak and Clugston 1999, Fox et al. 2000). Generally, fall downstream migration from the river into the estuary/GOM begins in September (at water temperatures around 23°C) and continues through November (Huff 1975, Wooley and Crateau 1985, Foster and Clugston 1997).

Sturgeon may be found in the test area between October and March, but movement or foraging is not likely to be affected by the structures themselves. Placement and removal of the structures may result in avoidance responses of any sturgeon in the immediate area due to human activity; however, such minor responses are not likely to adversely affect individuals. Normal behavior patterns of Gulf sturgeon are not expected to be significantly disrupted by the placement or removal of structures in the water during the brief training periods. The small test areas of the GOM and Santa Rosa Sound that will be affected, and the small period of time it will be affected is insignificant compared to habitat available to sturgeon in the vicinity. Therefore, we believe

the effects of the proposed action on Gulf sturgeon will be insignificant, and are not considered further in this opinion.

#### *Gulf sturgeon Critical Habitat*

Gulf sturgeon critical habitat was designated in 2003 (50 CFR 226.214). Federal agencies must insure that their activities are not likely to result in the destruction or adverse modification of designated critical habitat through adverse effects to the primary constituent elements (PCEs) within defined critical habitats. Areas on both the GOM side and Santa Rosa Bay side of Santa Rosa Island are designated as critical habitat and may be affected by the proposed ALRT activities.

The main activities affecting designated critical habitat unit 11 and unit 12 are the insertion and removal of objects in the seafloor during each 1-2 week testing period. Although ALRT test objects are proposed for only the GOM zone of the action area (Figure 2), we considered the potential for objects to occur in both designated critical habitat units since ALRT activities may occur on both sides of the island. Of the seven PCEs of Gulf sturgeon critical habitat discussed above, four are found in critical habitat unit 11 and unit 12: 1) food items; 2) water quality; 3) sediment quality; and 4) migratory pathways. Each of these four PCEs were considered, and discounted for the potential to be adversely affected by the proposed ALRT activities.

#### *Abundant Food Items*

It is probable that the substrate in the vicinity of the proposed action supports some prey items preferred by subadult and adult Gulf sturgeons (i.e., mole crabs, sand fleas, various amphipod species, and lancelets). The impacted areas are confined to very small area is where items are placed directly on or embedded a short depth into the sand with a screw anchor. The impact of temporary placement of these objects on the seafloor will have minimal impact on benthic invertebrates. Although it is possible for a very small number of potential prey items to be potentially killed during object placement and removal, no actions were identified that would result in any measurable impact to abundant prey items. Screw anchors will be used to for the four buoys marking the perimeter of the test area and insertion of some objects into the sand to secure them. Insertion and removal of anchors could displace, suspend, or crush invertebrates beneath the anchor. The small areas affected would be available for recolonization of invertebrate fauna following anchor removal. The effects to invertebrates are expected to be temporary and insignificant. Due to the short nature of this mission and removal of all equipment following the mission, loss of benthic prey species as a result of ALRT activities would be so small and fully recoverable, its consequences on the abundance of prey items is insignificant.

#### *Water Quality*

The placement and removal of the mines, barricades, and obstacles (either anchored to screw anchors or to poles jettied into the sand) on the GOM floor would result in turbidity due to the disturbance of bottom sediments. However, the disturbance would be minimal and would not result in significant or long-term effects to the water column. No changes in temperature, salinity, pH, hardness, oxygen content, or other chemical characteristics are expected from

pipeline construction. NMFS does not expect measurable impacts to the status of this PCE as a result of this project within designated Gulf sturgeon critical habitat.

#### *Sediment Quality*

As discussed above, sediment would be displaced by insertion of the mines, barricades, and obstacles. The proposed ALRT activities would not change the composition, characteristics, or functions of the sediment and no adverse affects to sediment quality are expected from object placement or removal.

#### *Migratory Pathways*

The mines, obstacles, and barricades would be placed on the GOM floor for 100 meters in length and no more than 30 meters from the shoreline. Objects may be in place for 1-2 week periods, approximately 4-5 times per year. The configuration and short time period of objects is not expected to affect the ability of Gulf sturgeon to migrate between riverine, estuarine, and marine habitats. The temporary placement of the devices associated with the Proposed Action would not significantly alter water flow or migratory behavior of the species. Therefore, the temporary placement of objects proposed is not expected to adversely affect migratory pathways.

#### *Summary of Effects to PCEs*

The Proposed Action would not appreciably affect the availability of prey items taken by the Gulf sturgeon. Placement and removal of the mines, barricades, and obstacles through anchoring to screw anchors or to poles jetted into the sand would cause only local and temporary turbidity. The area of habitat affected is very small relative to the area of similar habitats available in the GOM, and the temporary placement of the devices would not impede the migration of the species. Therefore, we believe the proposed ALRT activities are not likely to adversely affect critical habitat for the Gulf sturgeon.

### **3.2 Species Likely to Be Affected**

Loggerhead and green sea turtles both nest on Santa Rosa Island and are likely to be adversely affected by the proposed ALRT activities during the nesting season.

#### *3.2.1 Effects on Loggerhead and Green Sea Turtles Considered and Discounted*

NMFS has analyzed the proposed action during consultation with Eglin AFB for potential impacts to loggerhead and green sea turtles and their habitats. Activities determined not to affect these species in the action area have been excluded from further analysis.

#### *Lasers*

Lasers will be used by aircraft to locate objects in the target field. Lasers are enclosed in a light-tight enclosure with a mechanical shutter for stopping illumination when not over target fields. In addition, a number of laser safety devices are incorporated into the system to prevent inadvertent laser operation. Laser radiation received on the ground, the ALDAI-W is eye-safe at approximately 45.7 m, which is significantly lower than the planned minimum altitude of 152.4 m. Thus, animals in the water or in the surf zone would be safe from stray laser radiation. For ROAR laser use over the marine environment, the eye-safe distance is 643.74 m. Lasers would actively radiate approximately 50 m before the target array in the water, remain active over the

target field, and remain active slightly past it into the water (this would create a buffer zone of approximately 100 m before and after the target fields). Although aircraft are proposed to fly at altitudes between 152 and 914 ft, they would fly at speeds between 35 to 75 knots. The amount of time the laser would be in the water is extremely brief, traveling 195 m in approximately 5.4 to 10.9 s. The likelihood of a narrow-beam laser hitting the eye of a turtle during brief periods of laser use is so low it is discountable.

**Table 2. Estimated density of sea turtles in the eastern GOM from shore to 18.3 m depths (from Epperly et al. 2002) and adjusted density estimates using a dive profile of 10 percent of time at surface for each species to account for all animals potentially present in the water column.**

Species	Density (N km <sup>-2</sup> )	Corrected Density (N km <sup>-2</sup> )	Density (N 100 m <sup>-2</sup> )
leatherback	0.0026	0.0260	<0.0001
Kemp's ridley	0.0011	0.0110	<0.0001
loggerhead	0.0532	0.5320	<0.0001
green	0.0021	0.0210	<0.0001

#### *Effects of ALRT Tests on Foraging Loggerhead and Green Sea Turtles*

The proposed action is not expected to have any effects on prey abundance or distribution of sea turtle prey species (e.g., crustaceans, seagrass, or algae). The Florida Marine Research Institute estimates total seagrass coverage in Choctawhatchee Bay and the Okaloosa County portion of Santa Rosa Sound at 4,160 acres (Sargent et al. 1995). The nearest major seagrass bed in the GOM (GOM) is located outside of the study area. The habitat on the Gulf side and the sound side of Santa Rosa Island is a sandy/silty substrate, which does not support seagrass beds.

Based on the conservative density estimates for loggerhead and green sea turtles in the test area (Table 2), there is a low likelihood (< 0.0001 turtles) that these species would occur in the test area during the brief one to two week test period that objects are in the water. We are confident in this assessment since the test area is in shallow water depths (from shore to 4 m defined as the littoral zone in this opinion) where most sea turtles would not be expected to be foraging or naturally engaging in other behaviors.

We believe that based on these low density estimates and small size of the test area (100 m x 145 m), the likelihood of foraging sea turtles occurring in the test area is so low, it is discountable. However, nesting sea turtles and hatchlings would be expected to occur in the littoral zone and may be more likely to be affected by the proposed ALRT tests during the nesting season, and thus, are considered further in the *Effects of the Action* in section 5 of this opinion.

#### *Placement and Recovery of ALRT Test Objects*

The placement and removal of objects will occur with the assistance of vessels, vessels with cranes to lower heavier items, and divers to anchor items to the seafloor with screw anchors and to mark the positions of all objects by GPS. Placement of objects is proposed to occur over 3-4 days, and removal over 2-3 days. These activities would result in noise, and a prolonged human

presence in the water that could affect animals in the immediate vicinity. All placement and removal efforts are proposed to occur during the day and would not affect nesting sea turtles. As discussed above few, if any, foraging sea turtles are expected to occur in the shallow littoral waters of the ALRT test area. In the event a few turtles were to occur in the shallow area during the placement and removal of objects in the water over the lifetime of the action, any startle or avoidance responses would be brief and inconsequential to the animal. The effects of placement and removal of ALRT objects will have discountable effects on loggerhead and green sea turtles. The effects of the objects themselves on loggerhead and green sea turtles are discussed further in the *Effects of the Action* in section 5 of this opinion.

### 3.3 Status of the Species

The sea turtle subsections focus primarily on the Atlantic Ocean populations of these species since these are the populations that may be directly affected by the proposed action; as sea turtles are highly migratory, potentially affected species in the action area may make migrations to other areas of the GOM, Atlantic Ocean, and Caribbean Sea. Therefore, the range-wide status of the species described below also best reflects each species' status within the action area. Furthermore, these species are listed as global populations (with the exception of Florida green sea turtles, whose distribution is entirely in the Atlantic including the GOM), and the global status and trends of these species are included as well, in order to provide a basis for our final determination of the effects of the proposed action on the species as listed under the ESA.

#### 3.3.1 Loggerhead Sea Turtle

The loggerhead sea turtle was listed as a threatened species throughout its global range on July 28, 1978. It was listed because of direct take, incidental capture in various fisheries, and the alteration and destruction of its habitat. Loggerhead sea turtles inhabit the continental shelves and estuarine environments along the margins of the Atlantic, Pacific, and Indian Oceans. In the Atlantic, developmental habitat for small juveniles is the pelagic waters of the North Atlantic and the Mediterranean Sea (NMFS and USFWS 1991b). Within the continental United States, loggerhead sea turtles nest from Texas to New Jersey. Major nesting areas include coastal islands of Georgia, South Carolina, and North Carolina, and the Atlantic and GOM coasts of Florida, with the bulk of the nesting occurring on the Atlantic coast of Florida.

##### 3.3.1.1 Pacific Ocean

In the Pacific Ocean, major loggerhead nesting grounds are generally located in temperate and subtropical regions with scattered nesting in the tropics. Within the Pacific Ocean, loggerhead sea turtles are represented by a northwestern nesting aggregation located in Japan and a smaller southwestern nesting aggregation, which occurs in eastern Australia (Great Barrier Reef and Queensland) and New Caledonia (NMFS 2001a). There are no reported loggerhead nesting sites in the eastern or central Pacific Ocean basin. Data from 1995 estimated the Japanese nesting aggregation at 1,000 female loggerhead turtles (Bolten et al. 1996). Recent genetic analyses on female loggerheads nesting in Japan suggest that this "subpopulation" is comprised of genetically distinct nesting colonies (Hatase et al. 2002) with precise natal homing of individual females. As a result, Hatase et al. (2002) indicate that loss of one of these colonies would

decrease the genetic diversity of Japanese loggerheads; recolonization of the site would not be expected on an ecological time scale. In Australia, long-term census data has been collected at some rookeries since the late 1960s and early 1970s, and nearly all the data show marked declines in nesting populations since the mid-1980s (Limpus and Limpus 2003). The nesting aggregation in Queensland, Australia, was as low as 300 females in 1997.

Pacific loggerhead turtles are captured, injured, or killed in numerous Pacific fisheries including Japanese longline fisheries in the western Pacific Ocean and South China Sea; direct harvest and commercial fisheries off Baja California, Mexico; commercial and artisanal swordfish fisheries off Chile, Columbia, Ecuador, and Peru; purse seine fisheries for tuna in the eastern tropical Pacific Ocean; and California/Oregon drift gillnet fisheries. In addition, the abundance of loggerhead turtles on nesting colonies throughout the Pacific basin has declined dramatically over the past 10 to 20 years. Loggerhead turtle colonies in the western Pacific Ocean have been reduced to a fraction of their former abundance by the combined effects of human activities that have reduced the number of nesting females and reduced the reproductive success of females that manage to nest (e.g., due to egg poaching).

### 3.3.1.2 Atlantic Ocean

In the western Atlantic, most loggerhead sea turtles nest from North Carolina to Florida and along the Gulf coast of Florida. There are at least five western Atlantic subpopulations, divided geographically as follows: (1) A northern nesting subpopulation, occurring from North Carolina to northeast Florida at about 29°N; (2) a south Florida nesting subpopulation, occurring from 29°N on the east coast to Sarasota on the west coast; (3) a Florida Panhandle nesting subpopulation, occurring at Eglin Air Force Base and the beaches near Panama City, Florida; (4) a Yucatán nesting subpopulation, occurring on the eastern Yucatán Peninsula, Mexico (Márquez 1990; TEWG 2000); and (5) a Dry Tortugas nesting subpopulation, occurring in the islands of the Dry Tortugas, near Key West, Florida (NMFS 2001a). The fidelity of nesting females to their nesting beach is the reason these subpopulations can be differentiated from one another. Fidelity for nesting beaches makes recolonization of nesting beaches with sea turtles from other subpopulations unlikely.

#### *Life History and Distribution*

Past literature gave an estimated age at maturity of 21-35 years (Frazer and Ehrhart 1985; Frazer et al. 1994), with the benthic immature stage lasting at least 10-25 years. However, based on data from tag returns, strandings, and nesting surveys (NMFS 2001a), NMFS estimates ages of maturity ranging from 20-38 years with the benthic immature stage lasting from 14-32 years.

Mating takes place in late March through early June, and eggs are laid throughout the summer, with a mean clutch size of 100-126 eggs in the southeastern United States. Individual females nest multiple times during a nesting season, with a mean of 4.1 nests/individual (Murphy and Hopkins 1984). Nesting migrations for an individual female loggerhead are usually on an interval of 2-3 years, but can vary from 1-7 years (Dodd 1988). Generally, loggerhead sea turtles originating from the western Atlantic nesting aggregations are believed to lead a pelagic existence in the North Atlantic Gyre for as long as 7-12 years or more. Stranding records indicate that when pelagic immature loggerheads reach 40-60 cm straight-line carapace length

they begin to live in coastal inshore and nearshore waters of the continental shelf throughout the U.S. Atlantic and GOM, although some loggerheads may move back and forth between the pelagic and benthic environment (Witzell 2002). Benthic immature loggerheads (sea turtles that have come back to inshore and nearshore waters), the life stage following the pelagic immature stage, have been found from Cape Cod, Massachusetts, to southern Texas, and occasionally strand on beaches in northeastern Mexico.

Tagging studies have shown loggerheads that have entered the benthic environment undertake routine migrations along the coast that are limited by seasonal water temperatures. Loggerhead sea turtles occur year-round in offshore waters off North Carolina where water temperature is influenced by the Gulf Stream. As coastal water temperatures warm in the spring, loggerheads begin to migrate to North Carolina inshore waters (e.g., Pamlico and Core Sounds) and also move up the coast (Epperly et al. 1995a; Epperly et al. 1995b; Epperly et al. 1995c), occurring in Virginia foraging areas as early as April and on the most northern foraging grounds in the Gulf of Maine in June. The trend is reversed in the fall as water temperatures cool. The large majority leave the Gulf of Maine by mid-September but some may remain in mid-Atlantic and Northeast areas until late fall. By December loggerheads have emigrated from inshore North Carolina waters and coastal waters to the north to waters offshore North Carolina, particularly off Cape Hatteras, and waters further south where the influence of the Gulf Stream provides temperatures favorable to sea turtles ( $\geq 11^{\circ}\text{C}$ ) (Epperly et al. 1995a, Epperly et al. 1995b, Epperly et al. 1995c). Loggerhead sea turtles are year-round residents of central and south Florida.

Pelagic and benthic juveniles are omnivorous and forage on crabs, mollusks, jellyfish, and vegetation at or near the surface (Dodd 1988). Sub-adult and adult loggerheads are primarily coastal dwelling and typically prey on benthic invertebrates such as mollusks and decapod crustaceans in hardbottom habitats.

#### *Population Dynamics and Status*

A number of stock assessments (TEWG 1998, TEWG 2000, NMFS 2001, Heppell et al. 2003) have examined the stock status of loggerheads in the waters of the United States, but have been unable to develop any reliable estimates of absolute population size. Based on nesting data of the five western Atlantic subpopulations, the south Florida-nesting and the northern-nesting subpopulations are the most abundant (TEWG 2000, NMFS 2001). Between 1989 and 1998, the total number of nests laid along the U.S. Atlantic and Gulf coasts ranged from 53,014 to 92,182 annually with a mean of 73,751 (TEWG 2000). On average, 90.7 percent of these nests were of the south Florida subpopulation and 8.5 percent were from the northern subpopulation (TEWG 2000). The TEWG (2000) assessment of the status of these two better-studied populations concluded that the south Florida subpopulation was increasing at that time, while no trend was evident (may be stable but possibly declining) for the northern subpopulation. A more recent, yet-to-be-published analysis of nesting data from 1989-2005 by the Florida Wildlife Research Institute (FWRI) indicates there is a declining trend in nesting at beaches utilized by the south Florida nesting subpopulation (McRae-FWRI letter to NMFS 2006). Nesting data obtained for the 2006 and 2007 nesting seasons are also consistent with the decline in loggerhead nests (Meylan-FWRI pers. comm. 2007). It is unclear at this time whether the nesting decline reflects a decline in population, or is indicative of a failure to nest by the reproductively mature females

as a result of other factors (resource depletion, nesting beach problems, oceanographic conditions, etc.). The meaning of the nesting decline data is further confused by various in-water research that suggest the abundance of neritic juvenile loggerheads is steady or increasing (Ehrhart in press, M. Bresette pers. comm. regarding captures at the St. Lucie Power Plant; SCDNR unpubl. SEAMAP-SA data, Epperly et al. 2007). Although none of those studies provide proof of increasing juvenile populations, Epperly et al. (2007) determined that the trends in increasing loggerhead catch rates from all of those studies combined provide evidence that there has been an increase in neritic juvenile loggerhead abundance in the southeastern United States in the recent past. Whether that increase in abundance represents a true population increase amongst juveniles or merely a shift in spatial occurrence is not clear. NMFS has convened a new Turtle Expert Working Group for loggerhead sea turtles that will gather available data and examine the potential causes of the nesting decline and what the decline means in terms of population status. A final report by the loggerhead TEWG is expected in 2008.

For the northern subpopulations, recent estimates of loggerhead nesting trends in Georgia from standardized daily beach surveys showed significant declines ranging from 1.5 to 1.9 percent annually (Mark Dodd, Georgia Department of Natural Resources, pers. comm. 2006). Nest totals from aerial surveys conducted by the South Carolina Department of Natural Resources showed a 3.3 percent annual decline in nesting since 1980. Another consideration that may add to the importance and vulnerability of the northern subpopulation is the sex ratios of this subpopulation. NMFS scientists have estimated that the northern subpopulation produces 65 percent males (NMFS 2001a). However, new research conducted over a limited time frame has found opposing sex ratios (Wyneken et al. 2004) so further information is needed to clarify the issue. Since nesting female loggerhead sea turtles exhibit nest fidelity, the continued existence of the northern subpopulation is related to the number of female hatchlings that are produced. Producing fewer females will limit the number of subsequent offspring produced by the subpopulation.

The remaining three subpopulations – Dry Tortugas, Florida Panhandle, and Yucatán – are much smaller, but also relevant to the continued existence of the species. Nesting surveys for the Dry Tortugas subpopulation are conducted as part of Florida's statewide survey program. Survey effort has been relatively stable during the 9-year period from 1995-2003 (although the 2002 year was missed). Nest counts ranged from 168-270 but with no detectable trend during this period (Florida Fish and Wildlife Conservation Commission, Florida Marine Research Institute, Statewide Nesting Beach Survey Data). Nest counts for the Florida Panhandle subpopulation are focused on index beaches rather than all beaches where nesting occurs. Currently, there is not enough information to detect a trend for the subpopulation (*ibid.*). Similarly, nesting survey effort has been inconsistent among the Yucatán nesting beaches and no trend can be determined for this subpopulation. Zurita et al. (2003) found a statistically significant increase in the number of nests on seven of the beaches on Quintana Roo, Mexico, from 1987-2001 where survey effort was consistent during the period. However, nesting has declined since 2001 and the previously reported increasing trend appears to not have been sustained (NMFS and USFWS 2007a).

*Threats*

The diversity of a sea turtle's life history leaves them susceptible to many natural and human impacts, including impacts while they are on land, in the benthic environment, and in the pelagic environment. Hurricanes are particularly destructive to sea turtle nests. Sand accretion and rainfall that result from these storms as well as wave action can appreciably reduce hatchling success. For example, in 1992, all of the eggs over a 144.8-km length of coastal Florida were destroyed by storm surges on beaches that were closest to the eye of Hurricane Andrew (Milton et al. 1994). Also, many nests were destroyed during the 2004 hurricane season. Other sources of natural mortality include cold stunning and biotoxin exposure.

Anthropogenic factors that impact hatchlings and adult female turtles on land, or the success of nesting and hatching include: beach erosion, beach armoring and nourishment, artificial lighting, beach cleaning, increased human presence, recreational beach equipment, beach driving, coastal construction and fishing piers, exotic dune and beach vegetation, and poaching. An increase in human presence at some nesting beaches or close to nesting beaches has led to secondary threats such as the introduction of exotic fire ants, feral hogs, dogs, and an increased presence of native species (e.g., raccoons, armadillos, and opossums) which raid and feed on turtle eggs. Although sea turtle nesting beaches are protected along large expanses of the northwest Atlantic coast (e.g., Merritt Island, Archie Carr, and Hobe Sound National Wildlife Refuges), other areas along these coasts have limited or no protection. Sea turtle nesting and hatching success on unprotected high density east Florida nesting beaches from Indian River to Broward County are affected by all of the above threats.

Loggerhead sea turtles are affected by a completely different set of anthropogenic threats in the marine environment. These include oil and gas exploration, coastal development, and transportation, marine pollution, underwater explosions, hopper dredging, offshore artificial lighting, power plant entrainment and/or impingement, entanglement in debris, ingestion of marine debris, marina and dock construction and operation, boat collisions, poaching, and fishery interactions. Loggerheads in the pelagic environment are exposed to a series of longline fisheries, which include the Atlantic highly migratory species (HMS) pelagic longline fisheries, an Azorean longline fleet, a Spanish longline fleet, and various longline fleets in the Mediterranean Sea (Aguilar et al. 1995, Bolten et al. 1996). Loggerheads in the benthic environment in waters off the coastal United States are exposed to a suite of fisheries in federal and state waters including trawl, purse seine, hook and line, gillnet, pound net, longline, and trap fisheries (see further discussion in Section 4, Environmental Baseline).

### 3.3.1.3 Summary of Status for Loggerhead Sea Turtles

The abundance of loggerhead turtles on nesting beaches throughout the Pacific basin has declined dramatically over the past 10 to 20 years. Data from 1995 estimated the Japanese nesting aggregation at 1,000 female loggerhead turtles (Bolten et al. 1996), but it has probably declined since 1995 and continues to decline (Tillman 2000). The nesting aggregation in Queensland, Australia, was as low as 300 females in 1997.

In the Atlantic Ocean, absolute population size is not known, but based on extrapolation of nesting information, loggerheads are likely much more numerous than in the Pacific Ocean.

NMFS recognizes five subpopulations of loggerhead sea turtles in the western north Atlantic based on genetic studies. Cohorts from all of these are known to occur within the action area of this consultation. The south Florida subpopulation may be critical to the survival of the species in the Atlantic Ocean because of its size (over 90 percent of all U.S. loggerhead nests are from this subpopulation). In the past, this nesting aggregation was considered second in size only to the nesting aggregation on islands in the Arabian Sea off Oman (Ross 1979, Ehrhart 1989, NMFS and USFWS 1991b). However, the status of the Oman colony has not been evaluated recently and it is located in an area of the world where it is highly vulnerable to disruptive events such as political upheavals, wars, catastrophic oil spills, and lack of strong protections for sea turtles (Meylan et al. 1995). Given the lack of updated information on this population, the status of loggerheads in the Indian Ocean basin overall is essentially unknown. On March 5, 2008, NMFS and USFWS published a 90-day finding that a petitioned request to reclassify loggerhead turtles in the western North Atlantic Ocean as a distinct population segment may be warranted (73 FR 11849). A final determination on the petition must be made by November 16, 2008.

All loggerhead subpopulations are faced with a multitude of natural and anthropogenic effects that negatively influence the status of the species. Many anthropogenic effects occur as a result of activities outside of U.S. jurisdiction (i.e., fisheries in international waters).

### **3.3.2 Green Sea Turtle**

Federal listing of the green sea turtle occurred on July 28, 1978, with all populations listed as threatened except for the Florida and Pacific coast of Mexico breeding populations, which are endangered. The nesting range of the green sea turtles in the southeastern United States includes sandy beaches of mainland shores, barrier islands, coral islands, and volcanic islands between Texas and North Carolina, the U.S. Virgin Islands (USVI) and Puerto Rico (NMFS and USFWS 1991a). Principal U.S. nesting areas for green sea turtles are in eastern Florida, predominantly Brevard through Broward Counties (Ehrhart and Witherington 1992). Green sea turtle nesting also occurs regularly on St. Croix, USVI, and on Vieques, Culebra, Mona, and the main island of Puerto Rico (Mackay and Rebholz 1996).

#### **3.3.2.1 Pacific Ocean**

Green turtles have generally been thought to be declining throughout the Pacific Ocean, with the exception of Hawaii, from a combination of overexploitation and habitat loss (Seminoff 2002). In the western Pacific, the only major (>2,000 nesting females) populations of green turtles occur in Australia and Malaysia, with smaller colonies throughout the area. Indonesia has a widespread distribution of green turtles, but has experienced large declines over the past 50 years. Hawaii green turtles are genetically distinct and geographically isolated, and the population appears to be increasing in size despite the prevalence of fibropapilloma and spirochidiasis (Aguirre et al. 1998, in Balazs and Chaloupka 2003). The East Island nesting beach in Hawaii is showing a 5.7 percent annual growth rate over 25 plus years (Chaloupka et al. 2007). In the eastern Pacific, mitochondrial DNA analysis has indicated that there are three key nesting populations: Michoacan, Mexico; Galapagos Islands, Ecuador; and Islas Revillagigedos, Mexico (Dutton 2003). There is also sporadic green turtle nesting along the Pacific coast of

Costa Rica. However, the status of at least a few of the non-Hawaiian nesting stocks in the Pacific have recently been found to also be undergoing long-term increases. Data sets over 25 years in Chichi-jima, Japan, Heron Island, Australia, and Raine Island, Australia, show increases (Chaloupka et al. 2007). These increases are thought to be the direct result of long-term conservation measures.

### 3.3.2.2 Atlantic Ocean

#### *Life History and Distribution*

The estimated age at sexual maturity for green sea turtles is between 20-50 years (Balazs 1982, Frazer and Ehrhart 1985). Green sea turtle mating occurs in the waters off the nesting beaches. Each female deposits 1-7 clutches (usually 2-3) during the breeding season at 12-14 day intervals. Mean clutch size is highly variable among populations, but averages 110-115 eggs/nest. Females usually have 2-4 or more years between breeding seasons, whereas males may mate every year (Balazs 1983). After hatching, green sea turtles go through a post-hatchling pelagic stage where they are associated with drift lines of algae and other debris. At approximately 20 to 25 cm in carapace length, juveniles leave pelagic habitats and enter benthic foraging areas (Bjorndal 1997).

Green sea turtles are primarily herbivorous, feeding on algae and sea grasses, but also occasionally consume jellyfish and sponges. The post-hatchling, pelagic-stage individuals are assumed to be omnivorous, but little data are available.

Green sea turtle foraging areas in the southeastern United States include any coastal shallow waters having macroalgae or seagrasses. This includes areas near mainland coastlines, islands, reefs, or shelves, and any open-ocean surface waters, especially where advection from wind and currents concentrates pelagic organisms (Hirth 1997, NMFS and USFWS 1991a). Principal benthic foraging areas in the southeastern United States include Aransas Bay, Matagorda Bay, Laguna Madre, and the Gulf inlets of Texas (Doughty 1984, Hildebrand 1982, Shaver 1994), the GOM off Florida from Yankeetown to Tarpon Springs (Caldwell and Carr 1957, Carr 1984), Florida Bay and the Florida Keys (Schroeder and Foley 1995), the Indian River Lagoon System, Florida (Ehrhart 1983), and the Atlantic Ocean off Florida from Brevard through Broward counties (Wershoven and Wershoven 1992, Guseman and Ehrhart 1992). Adults of both sexes are presumed to migrate between nesting and foraging habitats along corridors adjacent to coastlines and reefs.

#### *Population Dynamics and Status*

The vast majority of green sea turtle nesting within the southeastern United States occurs in Florida (Meylan et al. 1995, Johnson and Ehrhart 1994). Green sea turtle nesting in Florida appears to be increasing over the past 18 years based on nesting data between 1989-2006 (NMFS and USFWS 2007b). The total mean annual number of nests in Florida over this time period is 83.5 nests. In this time period there have been three 'low' years. However, similar trends in data have been seen at other nesting areas (e.g., Tortuguero, Troëng and Rankin 2005), indicating that these periodic nesting decreases observed may be related to lesser reproductive effort due to environmental variability on foraging grounds, rather than a decrease in the number of nesting females (NMFS and USFWS 2007b).

Although nesting activity is obviously important in determining population distributions, the remaining portion of the green turtle's life is spent on the foraging and developmental grounds. Some of the principal feeding pastures in the western Atlantic Ocean include the upper west coast of Florida and the northwestern coast of the Yucatán Peninsula. Additional important foraging areas in the western Atlantic include the Mosquito and Indian River Lagoon systems and nearshore wormrock reefs between Sebastian and Ft. Pierce Inlets in Florida, Florida Bay, the Culebra archipelago and other Puerto Rico coastal waters, the south coast of Cuba, the Mosquito Coast of Nicaragua, the Caribbean Coast of Panama, and scattered areas along Colombia and Brazil (Hirth 1997). The summer developmental habitat for green turtles also encompasses estuarine and coastal waters from North Carolina to as far north as Long Island Sound (Musick and Limpus 1997).

There are no reliable estimates of the number of immature green sea turtles that inhabit coastal areas (where they come to forage) of the southeastern United States. However, information on incidental captures of immature green sea turtles at the St. Lucie Power Plant (they have averaged 215 green sea turtle captures per year since 1977) in St. Lucie County, Florida (on the Atlantic coast of Florida) show that the annual number of immature green sea turtles captured has increased significantly in the past 26 years (FPL 2002).

Immature green sea turtles foraging in the southeastern United States come from multiple genetic stocks; therefore, the status of immature green sea turtles in the southeastern United States might also be assessed from trends at all of the main regional nesting beaches, principally Florida, Yucatán, and Tortuguero. Trends at Florida beaches were previously discussed. Trends in nesting at Yucatán beaches cannot be assessed because of a lack of consistent beach surveys over time. Trends at Tortuguero (ca. 20,000-50,000 nests/year) showed a significant increase in nesting during the period 1971-1996 (Bjorndal et al. 1999), and more recent information continues to show increasing nest counts (Troëng and Rankin 2005). Recent modeling by Chaloupka et al. (2007) using data sets of 25 years or more has resulted in an estimate of the Florida nesting stock at the Archie Carr National Wildlife Refuge growing at an annual rate of 13.9 percent, and the Tortuguero, Costa Rica population growing at 4.9 percent annually.

#### *Threats*

The principal cause of past declines and extirpations of green sea turtle assemblages has been the over-exploitation of green sea turtles for food and other products. Although intentional take of green sea turtles and their eggs is not extensive within the southeastern United States, green sea turtles that nest and forage in the region may spend large portions of their life history outside the region and outside U.S. jurisdiction, where exploitation is still a threat. However, there are still significant and ongoing threats to green sea turtles from human-related causes in the United States. These threats include beach armoring, erosion control, artificial lighting, beach disturbance (e.g., driving on the beach), pollution, foraging habitat loss as a result of direct destruction by dredging, siltation, boat damage, other human activities, and interactions with fishing gear. Sea sampling coverage in the pelagic driftnet, pelagic longline, Southeast shrimp trawl, and summer flounder bottom trawl fisheries has recorded takes of green turtles. There is also the increasing threat from green sea turtle fibropapillomatosis disease. Presently, this disease is cosmopolitan and has been found to affect large numbers of animals in some areas, including Hawaii and Florida (Herbst 1994, Jacobson, 1990, Jacobson et al. 1991).

### 3.3.2.3 Summary of Status for Atlantic Green Sea Turtles

Green turtles range in the western Atlantic from Massachusetts to Argentina, including the GOM and Caribbean, but are considered rare in benthic areas north of Cape Hatteras (Wynne and Schwartz 1999). Green turtles face many of the same natural and anthropogenic threats as for loggerhead sea turtles described above. In addition, green turtles are also susceptible to fibropapillomatosis, which can result in death. In the continental United States, green turtle nesting occurs on the Atlantic coast of Florida (Ehrhart 1979). Recent population estimates for the western Atlantic area are not available. The pattern of green turtle nesting shows biennial peaks in abundance, with a generally positive trend during the almost 20 years of regular monitoring since establishment of index beaches in Florida in 1989. However, given the species' late sexual maturity, caution is warranted about over-interpreting nesting trend data collected for less than 20 years.

## 4 ENVIRONMENTAL BASELINE

The environmental baseline describes the effects of past and ongoing human and natural factors leading to the current status of the species, its habitat (including designated critical habitat), and ecosystem, within the action area. It includes the past and present impacts of all state, tribal, local, private, and other human activities in the action area, including impacts of these activities that will occur contemporaneously with this consultation. Unrelated Federal actions affecting the same species or critical habitat that have completed formal or informal consultation are also part of the environmental baseline, as are Federal and other actions within the action area that may benefit listed species or critical habitat.

### 4.1 Factors Affecting Sea Turtles in the Action Area

Sea turtles found in the action area may travel widely throughout the Atlantic, GOM, and Caribbean Sea; therefore, individuals found in the action area can potentially be affected by activities anywhere within this wide range. The most thorough account of permitted and non-permitted activities, including research activities that are not harmful to the turtles, in the entire U.S. Atlantic, GOM, and Caribbean can be found in Appendix 2 of the NOAA Technical Memorandum NMFS-SEFSC-455, *Stock Assessments of Loggerhead and Leatherback Sea Turtles and an Assessment of the Impact of the Pelagic Longline Fishery on the Loggerhead and Leatherback Sea Turtles of the Western North Atlantic* (NMFS SEFSC 2001).

The most significant activities affecting sea turtles in the action area are vessel operations, military activities, recreational fishing, and commercial fishing. A large portion of the action area is in a security area and is not open to the general public due to its proximity to military operations at Eglin AFB.

### 4.2 Federal Actions

In recent years, NMFS has undertaken numerous ESA section 7 consultations to address the effects of federally-permitted fisheries and other federal actions on threatened and endangered

sea turtles. Each of those consultations sought to develop ways of reducing the probability of adverse effects of the action on sea turtles. Similarly, recovery actions NMFS has undertaken under the ESA are addressing the problem of take of listed species in federal agency actions, as well as federally actions such as fishing, construction, and oil and gas industries. The summary below of anticipated sources of incidental take of sea turtles from federal actions includes only those actions which have already concluded or are currently undergoing formal section 7 consultation.

#### *4.2.1 Military Activities*

##### *ALRT Beach Activities*

The USFWS has previously issued take pertaining to the ALRT activities occurring on the beach in a June 4, 2004, opinion. That opinion considered the effects of the beach portion of the action area and issued incidental take for nesting females, nests, and hatchlings. The USFWS issued incidental take for up to one loggerhead sea turtle nest, one adult loggerhead female sea turtle, and 126 loggerhead hatchlings annually, and one green sea turtle nest, one green adult female sea turtle, and 136 green hatchlings biennially.

##### *Eglin Gulf Test and Training Range (EGTTR)*

In an October 20, 2004 opinion, NMFS determined that there is an expected impact to sea turtles in the action area as a result of the pressure waves and noise associated with detonating gunnery rounds from EGTTR mission activities. NMFS issued an annual incidental take for three lethal or non-lethal takes of loggerhead sea turtles annually, and one lethal or non-lethal take of a green sea turtle annually for this action.

##### *Naval Explosive Ordnance Disposal School (NEODS)*

In an October 25, 2004 opinion, NMFS determined that there is an expected impact to sea turtles in the action area as a result of explosions associated with NEODS training. NMFS issued incidental take over the five-year NEODS training plan for four lethal or non-lethal takes of loggerhead sea turtles over five years, and one lethal or non-lethal take of a green sea turtle over five years.

##### *Precision Strike Weapons Test (PSW)*

In a March 14, 2005 opinion, NMFS determined that there is an expected impact to sea turtles in the action area as a result of explosions associated with the PSW tests. Incidental take was issued for 10 lethal or non-lethal takes of loggerhead sea turtles over five years, and 3 lethal or non-lethal takes of green sea turtles over five years.

##### *Santa Rosa Island (SRI) Mission and Training Activities*

In an October 12, 2005 opinion, NMFS analyzed miss surf zone training on Santa Rosa Island and issued an incidental take statement for up to four lethal and/or non-lethal takes of green sea turtles (adults and hatchlings) and 11 lethal and/or non-lethal takes of loggerhead sea turtles (adults and hatchlings) from amphibious vehicles and use of explosives. The USFWS issued a December 1, 2005, opinion on training SRI activities and issued incidental take for SRI mission and training activities. The USFWS also found the SRI activities likely to adversely affect loggerhead and green sea turtles on the beach. Incidental take was issued for up to 23

loggerhead sea turtle nests, 6 adult loggerhead female sea turtles, and 2,300 - 2,898 loggerhead hatchlings annually, 13.6 green sea turtle nests, 4.2 green adult female sea turtles, and 1,850 green turtle hatchlings biennially.

#### *Naval Operations*

The USN Mine Warfare Center in Corpus Christi, Texas, may take, annually, up to five loggerheads and two green sea turtles, in combination, during training activities in the western GOM. Programmatic assessments and consultation with NMFS is currently underway on Naval sonar operation and operation areas.

#### *4.2.2 Dredging*

The construction and maintenance of Federal navigation channels has also been identified as a source of turtle mortality. Hopper dredges, which are frequently used in ocean bar channels and sometimes in harbor channels and offshore borrow areas, move relatively rapidly (compared to sea turtle swimming speeds) and can entrain and kill sea turtles, presumably as the drag arm of the moving dredge overtakes the slower moving turtle. A regional opinion for the COE's GOM hopper dredging operations was completed in November 2003 (NMFS 2003 as last revised on January 9, 2007). The opinion concluded "no jeopardy" for sea turtles and Gulf sturgeon. An ITS was provided, as well as reasonable and prudent measures specified to minimize impacts included the use of temporal dredging windows, intake and overflow screening, the use of sea turtle deflector dragheads, observer and reporting requirements, and sea turtle relocation trawling.

#### *4.2.3 Vessel Operation*

Potential sources of adverse effects from federal vessel operations in the action area include operations of the U.S. Department of Defense (DOD), Navy (USN), Air Force and Coast Guard (USCG), the USEPA, NOAA, and the COE. The NMFS has conducted formal consultations with the USCG, the USN, and NOAA on their vessel operations. NMFS has also conducted section 7 consultations with vessel traffic related to energy projects in the GOM (MMS, FERC, and MARAD) to implement conservation measures. Through the section 7 process, where applicable, the NMFS has and will continue to establish conservation measures for all these agency vessel operations to avoid or minimize adverse effects to listed species. At the present time, however, they present the potential for some level of interaction. Private vessels participate in high-speed marine events concentrated in the southeastern United States and are a particular threat to sea turtles. The magnitude of these marine events is not currently known. NMFS and the USCG (who permit these events) are in consultation on these events, but a thorough analysis has not been completed. Refer to the biological opinions for the USCG (NMFS 1995, NMFS 1996, NMFS 1998) and the USN (NMFS 1997a) for detail on the scope of vessel operations for these agencies and conservation measures being implemented as standard operating procedures.

Since the USN consultation only covered operations out of Mayport, Florida, potential still remains for USN vessels to adversely affect sea turtles when they are operating in other areas within the range of these species. Similarly, operations of vessels by other Federal agencies within the action area (NOAA, USEPA, COE) may adversely affect sea turtles. However, the in-water activities of those agencies are limited in scope, as they operate a limited number of

vessels or are engaged in research/operational activities that are unlikely to contribute a large amount of risk.

#### *4.2.4 Fisheries*

Adverse effects on threatened and endangered sea turtles from several types of fishing gear occur in the action area. These gears, including gillnet, hook-and-line (i.e., vertical line), and trawl gear have all been documented as interacting with sea turtles. For all fisheries for which there is a fishery management plan (FMP) or for which any federal action is taken to manage that fishery, the impacts have been evaluated via section 7 consultation. Formal section 7 consultations have been conducted on the following fisheries: the HMS shark fishery and the southeast shrimp trawl fishery. An ITS has been issued for the take of sea turtles in each of the fisheries. A summary of each consultation is provided below but more detailed information can be found in the respective biological opinions (NMFS 2001b, NMFS 2002, NMFS 2003).

The Southeast shrimp trawl fishery affects more sea turtles than all other activities combined (NRC 1990). NMFS completed the biological opinion (NMFS 2002a) for shrimp trawling in the southeastern United States under proposed revisions to the TED regulations (68 FR 8456, February 21, 2003). This biological opinion determined that the shrimp trawl fishery under the revised TED regulations would not jeopardize the continued existence of any sea turtle species. This determination was based, in part, on the biological opinion's analysis that shows the revised TED regulations are expected to reduce shrimp trawl related mortality by 94 percent for loggerheads.

GOM shark fisheries include commercial shark bottom longline and drift gillnet fisheries and recreational shark fisheries under the FMP for Atlantic Tunas, Swordfish, and Sharks (HMS FMP). The shark bottom longline and drift gillnet fisheries were both found likely to adversely affect sea turtles. An ESA section 7 consultation was completed on October 29, 2003, on the continued operation of those fisheries and the July 2003, Proposed Rule for Draft Amendment 1 to the HMS FMP (NMFS 2003a). The biological opinion concluded the proposed action was not likely to jeopardize the continued existence of any listed sea turtles. An ITS was provided authorizing non-lethal takes.

On February 12, 2005, NMFS issued a biological opinion (NMFS 2005c) on the continued authorization of reef fish fishing under the GOM reef fish fishery management plan (RFFMP) and proposed amendment 23. The fishery uses three basic types of gear: spear and powerhead, trap and hook-and-line gear. Hook-and-line gear used in the fishery includes both commercial bottom longline and commercial and recreational vertical line (e.g., handline, bandit gear, rod and reel). The biological opinion concluded that loggerhead and green sea turtles may be adversely affected by operation of the fishery and an ITS was provided. However, the proposed action was not expected to jeopardize the continued existence of any of these species.

Formal section 7 consultations have also been conducted for the issuance of several exempted fishing permits (EFP). These biological opinions have concluded the proposed activities may adversely affect but were not likely to jeopardize the continued existence of any sea turtles. ITSs for each EFP issued were provided.

**4.2.5 ESA Permits**

The ESA allows the issuance of permits to take ESA-listed species for the purposes of scientific research (section 10(a)(1)(a)). In addition, the ESA allows for the NMFS to enter into cooperative agreements with states developed under section 6 of the ESA, to assist in recovery actions of listed species. Prior to issuance of these authorizations, the proposal must be reviewed for compliance with section 7 of the ESA.

Sea turtles are the focus of research activities authorized by a section 10 permit under the ESA. There are currently 11 active scientific research permits directed toward sea turtles that are applicable to the action area of this biological opinion. Authorized activities range from photographing, weighing, and tagging sea turtles incidentally taken in fisheries, blood sampling, tissue sampling (biopsy), and performing laparoscopy on intentionally captured turtles. The number of authorized takes varies widely depending on the research and species involved but may involve the taking of hundreds of turtles annually. Most takes authorized under these permits are expected to be non-lethal. Before any research permit is issued, the proposal must be reviewed under the permit regulations (i.e., must show a benefit to the species). In addition, since issuance of the permit is a federal activity, issuance of the permit by the NMFS must also be reviewed for compliance with section 7(a)(2) of the ESA to ensure that issuance of the permit does not result in jeopardy to the species.

**4.3 State or Private Actions****4.3.1 Vessel Traffic**

Commercial traffic and recreational pursuits can have an adverse effect on marine mammals and sea turtles by direct physical impacts from vessel strikes, or by interactions with boat propellers.

**4.3.2 State Fisheries**

Several coastal state fisheries are known to incidentally take listed species, but information on these fisheries is sparse (NMFS 2001a). Various fishing methods used in these commercial and recreational fisheries, including trawling, pot fisheries, gillnets, and vertical line are all known to incidentally take sea turtles, but information on these fisheries is sparse (NMFS 2001a).

Although the past and current effects of state fisheries on listed species are currently not determinable, the NMFS believes that ongoing fishing activities in state water, may in part, be responsible for seasonally high levels of observed strandings of sea turtles on South Atlantic coastlines. Most state data are based on extremely low observer coverage or sea turtles were not part of data collection; thus, these data provide insight into gear interactions that could occur but are not indicative of the magnitude of the overall problem. The 2001 HMS biological opinion (NMFS 2001b) has an excellent summary of turtles taken in state fisheries through out the action area.

To address data gaps, several state agencies have initiated observer programs to collect information on interactions between listed species and certain gear types. Other states have closed nearshore waters to gear-types known to have high encounter rates with listed species. Depending on the fishery in question, many state permit holders also hold federal permits; therefore, existing section 7 consultations on federal fisheries may address some of the state fishery impacts. NMFS is also actively participating in a cooperative effort with Atlantic States

Marine Fisheries Commission to standardize and/or implement programs to collect information on level of effort and bycatch in state fisheries.

Additional information on impact of take (i.e., associated mortality) is also needed for analysis of impacts to sea turtles from these fisheries. Certain gear types may have high levels of sea turtle takes, but very low rates of serious injury or mortality. For example, hook-and-line takes rarely are dead upon retrieval of gear, but trawls and gillnets frequently result in immediate mortality. Leatherbacks seem to be susceptible to a more restricted list of fisheries, while hardshell turtles, particularly loggerheads, seem to appear in data from almost all state fisheries. The HMS biological opinion also summarizes sea turtle interactions with flynets and various trawl techniques that occur within the action area.

Louisiana, Mississippi, Alabama, and Florida have placed restrictions on gillnet fisheries within state waters such that very little commercial gillnetting takes place in southeast waters.

Observations of state recreational fisheries have shown that loggerhead and green sea turtles are known to bite baited hooks, and loggerheads frequently ingest the hooks. Hooked turtles have been reported by the public fishing from boats, piers, and beach, banks, and jetties and from commercial fishermen fishing for reef fish and for sharks with both single rigs and bottom longlines (NMFS 2001b). A detailed summary of the known impacts of hook-and-line incidental captures to loggerhead sea turtles can be found in the TEWG reports (1998, 2000).

#### 4.3.3 Oil and Gas Activities

Federal and state oil and gas exploration, production, and development are expected to result in some sublethal effects due to seismic exploration effects to protected species as reported in the analysis of federal activities for oil and gas lease sale biological opinions with the MMS, including impacts associated with the explosive removal of offshore structures, seismic exploration, marine debris, oil spills, and vessel operation. Many section 7 consultations have been completed on MMS oil and gas lease activities. Until 2002, these biological opinions concluded that one take of sea turtles may occur annually due to vessel strikes. Biological opinions issued on July 11, 2002 (Lease Sale 184), November 29, 2002 (Multi-Lease Sales 185, 187, 190, 192, 194, 196, 198, 200, 201), August 30, 2003 (Lease Sales 189 and 197), and June 29, 2007 (2007-2012 Five-Year Lease Plan) have concluded that takes of sea turtles may result from vessel strikes, marine debris, and spilled oil.

Explosive removal of offshore structures may adversely affect sea turtles. In an August 28, 2006 opinion, NMFS issued incidental take for MMS-permitted structure removals (by injury or mortality) of 18 sea turtles over a six-year period, including 15 loggerheads and a combination of up to three turtles of any other species. In July 2004, MMS completed a programmatic environmental assessment (PEA) on geological and geophysical exploration on the GOM Outer Continental Shelf, and a programmatic consultation for the GOM is that will consider the effects to sea turtles is underway for those activities.

#### 4.4 Other Potential Sources of Impacts in the Environmental Baseline

A number of activities that may indirectly affect listed species in the action area of this consultation include ocean dumping and disposal, aquaculture, and anthropogenic marine debris.

The impacts from these activities are difficult to measure. Where possible, conservation actions are being implemented to monitor or study impacts from these sources. Close coordination is occurring through the section 7 process on both dredging and disposal sites to develop monitoring programs and ensure that vessel operators do not contribute to vessel-related impacts.

#### *4.4.1 Marine Pollution*

Sources of pollutants in the GOM coastal regions include atmospheric loading of pollutants such as PCBs, stormwater runoff from coastal towns, cities and villages, runoff into rivers emptying into the bays, groundwater and other discharges, and river input and runoff. Nutrient loading from land-based sources such as coastal community discharges is known to stimulate plankton blooms in closed or semi-closed estuarine systems. The effects on larger embayments are unknown. Although pathological effects of oil spills have been documented in laboratory studies of marine mammals and sea turtles (Vargo et al. 1986), the impacts of many other anthropogenic toxins have not been investigated.

#### *4.4.2 Acoustic Impacts*

NMFS has also been working to establish criteria to predict varying levels of responses of marine mammals to anthropogenic noise, based upon hearing injury and behavioral responses of marine mammals. Responses to noise exposure may include lethal or non-lethal injury, temporary hearing impairment, behavioral harassment and stress, or no apparent response. Ambient noise in the GOM is approximately 40 dB re 1 µPa above estimated baseline levels prior to industrialization, and it is expected to increase. Contributions to ambient noise levels include vessels; geophysical exploration; and the construction, operational, and decommissioning of offshore structures. It is expected that the policy on managing anthropogenic sound in the oceans will provide guidance for programs such as incidental harassment permits under the Marine Mammal Protection Act and permits for research involving sound-producing activities. NOAA is working cooperatively with the ship-building industry to find technologically-based solutions to reduce the amount of noise produced by commercial vessels. Through ESA consultation with NMFS, MMS has implemented GOM-wide measures to reduce the risk of harassment to sperm whales from noise produced by geological and geophysical surveying activities and the explosive removal of offshore structures.

#### *4.4.3 Hypoxia*

A large area of the Louisiana continental shelf with seasonally-depleted oxygen levels (< 2mg/l) is caused by eutrophication from both point and non-point sources. Most aquatic species cannot survive at such low oxygen levels and these areas are known as "dead zones." The oxygen depletion, referred to as hypoxia, begins in late spring, reaches a maximum in mid-summer, and disappears in the fall. After the Mississippi River flood of 1993, the spatial extent of this zone more than doubled in size, to over 18,000 km<sup>2</sup>, and has remained about that size each year through mid-summer of 1997. The hypoxic zone has impacts on the animals found there, including sea turtles, and the ecosystem-level impacts continue to be investigated.

#### *4.4.4 Natural Seeps*

Naturally occurring hydrocarbon seepage has long been identified as a significant source of hydrocarbons. Tarballs coming from natural seeps were used by early indigenous man living along the GOM coast to construct hunting tools. Given that the GOM is a prolific petroleum-producing province, its seafloor is pocketed with areas from which oil and gas seep. Accurately

calculating the volume of naturally seeping oil is problematic. Often the volume measured floating on the surface of the water or beached has been used as the best indicator of the volume originally seeped.

#### *4.4.5 Conservation and Recovery Actions Benefiting Sea Turtles in the Action Area*

NMFS has implemented a series of regulations aimed at reducing potential for incidental mortality of sea turtles in commercial fisheries. In particular, NMFS has required the use of TEDs in southeast U.S. shrimp trawls since 1989 and in summer flounder trawls in the mid-Atlantic area (south of Cape Charles, Virginia) since 1992. It has been estimated that TEDs exclude 97 percent of the sea turtles caught in such trawls. These regulations have been refined over the years to ensure that TED effectiveness is maximized through proper placement and installation, configuration (e.g., width of bar spacing), floatation, and more widespread use. Analyses by Epperly and Teas (2002) indicated that the minimum requirements for the escape opening dimensions in TEDs in use at that time were too small, and that as many as 47 percent of the loggerheads stranding annually along the Atlantic Seaboard and GOM were too large to fit through existing openings. On February 21, 2003, NMFS published a final rule to require larger escape openings in TEDs used in the southeast shrimp trawl fishery (68 FR 8456, February 21, 2003). Based upon the analyses in Epperly et al. (2002), leatherback and loggerhead sea turtles will greatly benefit from the new regulations, with expected reductions of 97 percent and 94 percent, respectively, in mortality from shrimp trawling. Several states have regulations requiring the use of TEDs in state-regulated trawl fisheries, and the federal regulations also apply in state waters.

In 1993 (with a final rule implemented in 1995), NMFS established a Leatherback Conservation Zone to restrict shrimp trawl activities from the coast of Cape Canaveral, Florida, to the North Carolina/Virginia border. This provided for short-term closures when high concentrations of normally pelagically distributed leatherbacks are recorded in near coastal waters where the shrimp fleet operates. This measure was necessary because, due to their size, adult leatherbacks were larger than the escape openings of most NMFS-approved TEDs. With the implementation of the new TED rule requiring larger opening sizes on all TEDs, the reactive emergency closures within the Leatherback Conservation Zone became unnecessary, and the Leatherback Conservation Zone was removed from the regulations.

NMFS is also working to develop a TED that can be effectively used in a type of trawl known as a flynet, which is sometimes used in the mid-Atlantic and Northeast fisheries to target sciaenids and bluefish. Limited observer data indicate that takes can be quite high in this fishery. Prototype designs have been tested since December 2002, but an effective TED for this fishery has not yet been developed. Development of a larger TED for the winter trawl fishery is also underway.

NMFS has also been active in public outreach efforts to educate fishermen regarding sea turtle handling and resuscitation techniques. As well as making this information widely available to all fishermen, NMFS recently conducted a number of workshops with Atlantic HMS pelagic longline fishermen to discuss bycatch issues including protected species, and to educate them regarding handling and release guidelines. NMFS intends to continue these outreach efforts and hopes to reach all fishermen participating in the Atlantic HMS pelagic longline fishery over the

next one to two years. There is also an extensive network of Sea Turtle Stranding and Salvage Network participants along the Atlantic and GOM coasts who not only collect data on dead sea turtles, but also rescue and rehabilitate any live stranded sea turtles.

Loggerheads, leatherbacks, greens, and Kemp's ridleys are known to bite a baited hook, frequently ingesting the hook. Hooked turtles have been reported by the public fishing from boats, piers, beaches, banks, and jetties. Necropsies have revealed hooks internally, which often were the cause of death. NMFS currently is exploring adding questions about encounters with sea turtles to intercept interviews of recreational fishermen conducted by the Texas Parks and Wildlife Department under the auspices of the Marine Recreational Fishery Statistics Surveys conducted throughout the GOM and along the Atlantic Coast as well as adding such information to the MRFSS database. NMFS is also considering questioning recreational fishermen aboard headboats throughout the southeast U.S. Atlantic and the GOM to quantify their encounters with sea turtles (TEWG 2000). Detailed summaries of the impact of hook and line incidental captures on loggerhead sea turtles can be found in the TEWG reports (1998, 2000).

The Recovery Plans for loggerhead and Kemp's ridley sea turtles are in the process of being updated. Recovery teams comprised of sea turtle experts have been convened and are currently working towards revising these plans based upon the latest and best available information.

## **5      EFFECTS OF THE ACTION**

In this section of the opinion, we assess the effects of the proposed action on listed species within the action area. The analysis in this section forms the foundation for our jeopardy analysis in Section 7. A jeopardy determination is reached if we would reasonably expect a proposed action to cause reductions in numbers, reproduction, or distribution that would appreciably reduce a listed species' likelihood of surviving and recovering in the wild. The status of each listed sea turtle species likely to be adversely affected by the proposed action is reviewed in Section 3. Loggerhead and green sea turtles are listed because of their global status; a jeopardy determination must therefore find the proposed action will appreciably reduce the likelihood of survival and recovery of each species globally.

The quantitative and qualitative analyses in this section are based upon the best scientific and commercial data available on the species' biology and the effects of the proposed action. When analyzing the effects of any action, it is important to consider indirect effects as well as the direct effects. Indirect effects are caused by or result from the proposed action, are later in time, and are reasonably certain to occur; however, due to the short duration of each ALRT test, only direct effects are expected and we did not identify any indirect effects that may result from activities associated with ALRT tests due to the short-term and minor impacts of the ALRT tests.

Loggerhead and green sea turtles are the only species that regularly nest on Santa Rosa Island. Although stranded individuals of any species may occur, healthy individuals are not expected to occur in the very shallow depths (0-4 m) of the test area and are discussed in section 3 of this opinion. Therefore, only the two species that regularly nest on Santa Rosa Island are considered in this effects analysis. Loggerheads commonly nest in the test area, followed in frequency by

green sea turtles. Sea turtle nesting in the northwest region of Florida usually begins in mid-May, with turtles beginning to congregate offshore in the March/April time frame. Peak nesting activity occurs in June and July, and nesting generally concludes by the end of August. Seasonal timing of ALRT tests will affect sea turtles and hatchlings. The main effects of the ALRT tests include the entanglement and entrapment of females and hatchlings by the objects located in the water, and the predation of hatchlings attracted to the lighted buoys. As an overview of the factors considered in this analysis, the following are the main factors of the action considered in the potential for sea turtles to be adversely affected:

- tests may occur both day and night;
- objects vary in size and shape that may inhibit movement, entrap, or entangle sea turtles;
- tests may occur anytime of year;
- 25 percent of flights will occur at night;
- 4-5 missions will occur annually;
- objects are in the water at all times during each 1-2 week testing period (4 –10 total weeks annually); and
- 4 lighted buoys will demarcate the test area.

This test area falls within three index beach nesting zones over a distance of 1.6 km. ALRT project personnel will secure test objects over a 100-m distance, and no more than 30 m (4-m depths) offshore. Eglin NRS provided historical nesting/false crawl data from the test area as the best indicator of adult sea turtle presence in the water during the nesting season. The majority of turtles close to the shoreline in the test area will be female turtles during the nesting season or neonates finding their way into the water following hatching. Since objects will be placed in depths from shore up to 4 m and lighted buoys a distance of 50 m away from the perimeter of the test area, the majority of sea turtles close to shore are expected to be nesting females.

### 5.1 Estimated Sea Turtle Abundance in the Test Area

In section 3 we determined that based on conservative density estimates, the likelihood of adverse effects occurring in the test area is so low, it is discountable, with the exception that nesting sea turtles and hatchlings would be expected to occur in the littoral zone and may be more likely to be affected by the proposed ALRT tests during the nesting season. We took the annual average number of nesting attempts on Santa Rosa Island as the seasonal abundance estimate of nesting females in the test area (Table 3).

**Table 3. The number of nests and false crawls over 18 years on Santa Rosa Island to estimate inshore littoral zone abundance of female sea turtles during the nesting season.**

Species	Historical Nests and False Crawls on SRI	Adjusted Estimate <sup>a</sup>	Years Surveyed	Nesting Attempts/Yr on SRI
loggerhead	472	576	18	32
green	177 <sup>a</sup>	217	18	12 <sup>b</sup>

<sup>a</sup>Estimate corrected for 144 unidentified hardshell sea turtle false crawls and nests based on the ratio of known sea turtles over the over the same time period.

<sup>b</sup>Includes 6 consecutive years when no nesting was observed on the Santa Rosa Island.

The occurrence of nesting sea turtles in the test area may result in seasonal abundances larger than those predicted by overall density estimates. Since sea turtles may remain in the surrounding area during the nesting season, total nesting along the entire length of Santa Rosa Island was used to calculate a best abundance estimate of the individuals that may be in the area during nesting season.

Hatching abundance was estimated in the test area by taking the historical average number of nests over the last 18 years, and by calculating the mean number of nests expected to occur annually in a 100-m stretch of beach (Table 4), using an average nest size of 126 hatchlings and 136 hatchlings for loggerhead and green sea turtles, respectively.

**Table 4.** The estimated number of nests and false crawls in the 100-m test area used to estimate nesting activity and hatchlings in the test area.

Species	Total Nests on SRI	Nests /False Crawls in Test Area	Yrs Surveyed	Turtles/ Yr	Turtles/ 100 m/Yr in Test Area	Hatchlings /Yrs
loggerhead	301	30	18	16.7	2 per yr <sup>a</sup>	252/yr
green	114	5	18	6.3 <sup>b</sup>	1 per 2 yrs <sup>c</sup>	136/2 yrs

<sup>a</sup>An average of 1.7 nests was rounded up to 2 loggerhead sea turtle nests/yr.

<sup>b</sup>Includes 6 consecutive years where no nesting was observed on Santa Rosa Island.

<sup>c</sup>An average of 0.5 nests per year is considered to be 1 green sea turtle nest/2 yrs.

The time of year the ALRT tests occur will determine the likelihood of sea turtles being affected by the ALRT activities. Since the test area encompasses a 100 m x 30 m area from shore out to 4 m in depth, nesting females and hatchlings migrating off the beach are the life stages expected to be affected by ALRT tests.

## 5.2 ALRT Test Objects Affecting Loggerhead and Green Sea Turtles

The approximate number of structures in the water across the 100-m test area includes:

- 25 hedgehogs
- 25 sea urchins up to a distance of 100 meters
- 100 mine-like objects equally distributed at surface, in water column, and on bottom
- 50 AL mines
- up to 100 meters of concertina wire
- 10 concrete blocks
- 25 AT mines
- 6 environmental instruments
- 4 lighted buoys
- 10 Type 2 AL mines

Figures 2-5 show the ALRT test objects (type 2 antilanding mines, structural hedgehogs, structural sea urchins, and concertina wire) that may entrap or entangle sea turtles.



**Figure 2.** Type 2 antilanding craft mines at 2- to 3-m depths and spaced 15 m apart.



**Figure 3.** Structural hedgehogs measuring 1 m x 1m x 1m in approximately 1.3-m depths with 10 m spacing.



**Figure 4.** Structural sea urchins are 3 pieces of rebar welded in the shape of a teepee measuring and erected in a row measuring 2m tall, 0.9-m in depth, and 100 m long. (structural sea urchins placed in water will not be wrapped in fencing as shown)



**Figure 5.** Concertina wire or wire rolls manufactured to simulate concertina wire in 0.3 m of water and 100 m long.

There is also a possibility of turtles being attracted to the lights on the buoy demarcating the test area and becoming entangled in the anchor lines (not shown). Although the concrete blocks, water quality instrumentation, AL and AT inert mines may pose obstacles in the water column, they are small enough and spaced at a distance that will not obstruct movement, nor cause an entrapment risk due to the shape and mass of the objects.

### **5.3 Effects of Entanglement and Entrapment**

Nesting and hatching activity usually occurs under the cover of darkness, and sea turtles are therefore more likely to be entangled and entrapped in objects at night when more individuals are expected nearshore in the surf zone. To simplify the analysis of ALRT tests on sea turtles, the sea turtle reproduction cycle can be divided into four time periods. During the first time period, only nesting occurs within the activity area. During the second time period, hatchlings emerge from previously laid nests while adult sea turtles continue to come ashore to lay new nests. During the third time period, adults have ceased to come ashore for nesting while hatchlings continue emerging from existing nests. During the fourth time period, neither nesting nor hatching behavior is expected to occur in the activity area. A six-month period between May 1 and October 31 encompasses periods 1-3 of the sea turtle nesting/hatching season on Santa Rosa Island. Since ALRT tests are proposed to occur regularly every few months throughout the calendar year (4-5/yr), approximately one-half of the tests (2.5 tests/yr) are expected to occur during the nesting/hatching season.

The following analysis considers the effects to both females and hatchlings. Due to the overlapping of the nesting and hatching periods, we estimate that a total of 2 ALRT tests may occur during the nesting season and a total of two ALRT tests during the hatching season, for a total risk period of 2-4 weeks resulting from objects in the water for each life stage, annually. To estimate the potential risk of entanglement and entrapment of female sea turtles, we considered the following behaviors in the risk analysis. During the nesting season, sea turtles congregate offshore along the shoreline of the Santa Rosa Island nesting area. On average, loggerhead sea

turtles lay four clutches of eggs per year, and green sea turtle lay three clutches of eggs per year. Nesting may occur anywhere along the island. Females remain in the area and may swim along the shoreline before nesting throughout the nesting season and will emerge through the surf zone to attempt nesting. Additionally, turtles may false crawl (crawl up the beach, but not lay eggs), further increasing sea turtle activity in the surf zone at night. We believe that more turtles (17 loggerheads and 6 greens) are potentially at greater risk of entanglement and entrapment in the water during inshore activity during the nesting season (*see column 4 in Table 5*). Fewer females (2 loggerheads per year and 1 green every 2 yrs) are expected to be at risk when returning to the water due to the lower number of actual expected nests along the 100-m long test area (*see 5 column in Table 5*). When hatchlings emerge from nests, they crawl toward the brightest horizon, which is usually seaward under natural conditions. Hatchlings enter the water and swim offshore.

#### *Entanglement*

Nesting females may be at risk of entanglement in the buoy float lines or the simulated concertina wire. These objects will not pose an entanglement risk to hatchlings due to their small size. One-half inch, tri-braid nylon rope will be used to attach each buoy to an anchor. Rope can become wrapped around any part of a sea turtle's body. During emergence through the surf zone during nesting attempts and during the return following a nesting attempt, heads and flippers may also become entangled in the concertina wire.

Although the buoy lines themselves pose little risk of entangling a turtle due to the few lines proposed, each buoy will be equipped with an omni-directional light 1.2 m above the surface of the water, and visible to the human eye up to a distance of 1 nmi. This is of concern when females are concentrated in the nearshore environment during the nesting season, particularly at night when the lighted buoy will illuminate the surrounding waters. The lighted buoys may attract sea turtles for foraging or investigation out of curiosity, resulting in an increased risk of entanglement in a buoy line. Although not all interactions with the buoy line are expected to result in entanglement, we believe there is a risk over the lifetime of the action (until the year 2020) of the ALRT tests. Entanglement could be fatal if the turtle were to remain submerged and be unable to breathe at the surface. Estimating entanglements is difficult since it depends on a variety of factors including the time of year ALRT tests occur, the number of sea turtles in the test area, behavior of individuals, and type of interaction with the buoy lines. The buoy lines are few and will be in the water only up to two weeks at a time. Based on the relative abundances of each species in the test area, we estimate that a total of three sea turtles (**2 loggerhead sea turtles and 1 green sea turtle**) may become lethally entangled in buoy lines over the lifetime of the ALRT tests (until 2020) due to attraction to the lighted buoys.

The concertina wire will be placed in the shallow waters (0.3 m) of the surf zone with little or no clearance over the top. Entanglement in the concertina wire is a possibility. An anticipated 2 loggerhead sea turtles per year, and an estimated one green sea turtle every two years will make a nesting attempt in the ALRT test area. Because the wire will be left in the water at night and limited observations are proposed for the 25 percent of the tests anticipated to occur at night, a sea turtle emerging through the surf for a nesting attempt is likely to go unobserved. A sea turtle encountering the concertina wire may be behaviorally disturbed by being deterred from nesting in the test area once contacting the wire, or a sea turtle may continue to ascend through the wire

to the beach and become entangled. Since the wire will be secured to the substrate, a sea turtle attempting to push under the wire may also become entangled since the wire is not likely to move to an extent to allow passage of a sea turtle. However, since the wire is placed in the upper surf zone (the swash), any entanglement is not likely to be life-threatening and would be observed following the exercise or the following morning during the proposed beach surveys. However, minor injuries from the wire injury and stress upon individuals may occur.

During the anticipated lifetime of the proposed ALRT tests (until the year 2020), we anticipate that 22 loggerhead sea turtles and 6 green sea turtles will come into contact with concertina wire based on anticipated nesting attempts in the test area (see Table 5). We anticipate most encounters with the wire will result in a failed nesting attempt and that the sea turtle will nest on an adjacent beach. However, due to anticipated variability in the size and behavior among nesting individuals, we estimate that approximately one in ten nesting sea turtles of each species will become entangled in the concertina wire. Loggerheads are about three times as likely to be found in the area than green sea turtles; therefore, a greater risk of entanglement is expected. Since the USFWS (USFWS 2004) has already issued an incidental take statement for ALRT tests that includes harassment in the form of disturbing or interfering with adult female sea turtles approaching the beach, we (NMFS) anticipate the non-lethal entanglement of **3 loggerhead sea turtles** and the non-lethal entanglement of **1 green sea turtle** over the lifetime of the proposed ALRT tests.

#### *Entrapment*

NMFS has become aware of numerous private artificial reef designs being employed in the GOM that may potentially entrap sea turtles. Small-diameter rebar framed modules (e.g., pyramids) with large gaps between bars will not act as a fish trap, but may very likely act as a sea turtle trap. It is possible for a sea turtle to position itself under the module frame bars, and when attempting to extract itself it may become wedged or trapped inside the reef material. Sea turtle mortalities resulting from entrapment have been associated with steel "pup-tent" modules off South Carolina (M. Barnette, NMFS, pers. obs.). Sea turtle remains have also been observed associated with concrete modules off Florida (Fish Haven brand module; Florida Fish and Wildlife Conservation Commission Artificial Reef Program website). Thus, the potential for sea turtles to become entrapped and drown has been demonstrated in artificial reef materials. We believe that the temporary ALRT structures may also pose a risk of entanglement of sea turtles during the nesting season.

The structural sea urchins, structural hedgehogs, and type 2 antilanding mines could potentially entrap female sea turtles. Hatchling sea turtles are not expected to be entrapped by these structures due to the large spaces in the structures and small size of the hatchlings. The USFWS has issued an incidental take statement for the disorientation of hatchling turtles in the test area as they emerge from the nest and crawl to the water due to objects on the beach. The USFWS opinion on ALRT tests requires that either nests will be relocated from the test area, or fencing will be put up to redirect hatchling away from the hazards on the beach into the water. This measure will also reduce the potential for harm in surf zone structures since the layout in the water is aligned with those on the beach. The effects of lighted buoys are discussed in further detail in the following subsection.

Female turtles may enter the spaces under the test objects while swimming, seeking shelter to rest, or while foraging. Additionally, females swimming and hauling through the surf during nesting attempts and returns to the sea will encounter a variety of structures in the ALRT test area. The urchins, hedgehogs, and type 2 mines all have spaces large for sea turtles to enter, but may entrap individuals once partially or completely inside the structure. There are a total of 25 structural hedgehogs, 25 structural sea urchins, and 10 mines in the 100 m x 30 m ALRT test area. These structures will be present for up to 4 weeks each year during the sea turtle nesting season. We believe both females making nesting attempts and females located in the area during the inter-nesting period may be at risk of entrapment in these structures. Females making nesting attempts are believed to be at greater risk of entrapment in shallow structures located in the surf zone. Entrapment may result in drowning of sea turtles when individuals cannot free themselves or reach the surface to breathe. Similar to encounters with concertina wire, most sea turtles would be expected to go around the test object or be deterred from the nesting attempt; however, due to the variability in water depths, turtle size, and behavior, we expect some individuals to become entrapped in these objects. Based on the nesting estimates in Table 5, we believe that up to **3 loggerhead sea turtles**, and **one green sea turtle** may be lethally taken by drowning in ALRT structures over the lifetime of the proposed ALRT tests.

#### **5.4 Lighted Buoys and Hatchling Predation**

Hatchling sea turtles primarily orient toward the brightest horizon (usually seaward over the open ocean) upon emergence from the sand. Artificial lighting near nesting beaches can be detrimental to hatchling sea turtles because it alters the critical nocturnal behaviors of hatchlings entry to the sea (Witherington and Martin 1996). Hatchlings attracted to the buoys will be at a significantly higher risk of predation since large birds and fish may also congregate around the structure and light emitted by the buoy.

Eglin AFB indicates that the lighted buoys would be visible to a human observer up to a distance of 1 nmi from the buoy. The estimation of take from disorientation and hatchling predation due to buoy attraction is difficult to determine. The lighted buoys would be placed approximately 50 m away from the perimeter of the test area. The USFWS opinion on this activity requires that nests located within the test area be relocated at least 15.2 m away from the boundaries of the test site. Although doing so will reduce the risk of harm from test obstacles located on the beach, relocating nests outside of the test boundary may place emerging hatchlings in a more direct line of sight of the lighted buoys when the test area is in use. Hatchlings emerging from nearby nests that were not relocated could also be in line of sight of the lighted buoys and orient toward the buoys marking the perimeter in the ALRT test area. During consultation with Eglin AFB alternative methods of marking the perimeter of the test area, such as highly directing light upwards, reflective buoys, or acoustic signals were discussed. These methods could reduce the potential for hatchlings to orient and swim towards the buoys. Due to considerations of human safety during ALRT tests, Eglin AFB has indicated that these alternatives are not viable.

We expect that hatchlings crawling on the beach may orient toward lighted buoys close to the shoreline, and hatchlings in the water may orient toward the buoys further from shore. Since the buoys are located relatively close to shore, a hatchling would need to surface and observe the lighted buoy to orient its swimming direction towards it. Mortality rates of hatchlings are naturally high and the behavior of individual hatchlings in the water can vary depending on local

environmental conditions, orientation cues, and presence of predators in the test area. However, it is reasonable to assume some percentage of hatchlings will orient toward the buoys, and some percentage of those attracted hatchlings will be preyed upon.

Based upon the average number of turtle nests anticipated to occur in the test area (Table 5), we estimate 33 percent of hatchlings will be disoriented by the lighted buoys, of which 50 percent of disoriented hatchlings in the water will result in mortality. Based on these estimates, we believe that a total of **84 loggerhead hatchlings annually** (42 lethal and 42 non-lethal), and a total of **46 green sea turtle hatchlings biennially** (23 lethal and 23 non-lethal) will be taken by disorientation to lighted buoys.

#### *Summary of Effects*

Our analysis has determined that a small risk of entrapment and entanglement exists for female green and loggerhead sea turtles during the nesting season on Santa Rosa Island; however, a few sea turtles are expected to be taken over the lifetime of the action (Table 5). Hatchlings may be attracted to the lighted buoys marking the perimeter of the ALRT test area. The actual number of hatchlings that may be disoriented by lighted buoys is difficult to quantify due to a number of confounding factors and difficulty in observing these effects in the wild. However, we estimate 50 percent of hatchling disorientations (approximately 16.7 percent of total hatchlings in the test area) may result in mortality.

**Table 5. Summary of take estimated from ALRT test activities.**

Species	Adult Entanglement		Adult Entrapment		Hatchling Disorientation	
	Lethal	Non-lethal	Lethal	Non-lethal	Lethal	Non-lethal
loggerhead	2 <sup>a</sup>	3 <sup>a</sup>	3 <sup>a</sup>	0	42 <sup>b</sup>	42 <sup>b</sup>
green	1 <sup>a</sup>	1 <sup>a</sup>	1 <sup>a</sup>	0	23 <sup>c</sup>	23 <sup>c</sup>

<sup>a</sup>Take estimated is over the lifetime of the action until 2020.

<sup>b</sup>Take is estimated annually.

<sup>c</sup>Take estimated is biennially.

## 6 CUMULATIVE EFFECTS

Cumulative effects include the effects of future state, tribal, local, or private actions that are reasonably expected to occur in the action area. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Within the action area, major future changes are not anticipated in the ongoing human activities described in the environmental baseline. The present, major human uses of the action area are commercial and recreational fishing and recreational beach use and boating. These activities are expected to continue at the present levels of intensity in the near future. As discussed in Section 4, however, listed species may be affected during their life cycles by non-federal activities outside the action area.

State-regulated commercial and recreational fishing activities in Atlantic Ocean and GOM waters currently result in the incidental take of threatened and endangered species. It is expected that states will continue to license/permit large vessel and recreational watercraft operations which do not fall under the purview of a federal agency, and issue regulations that will affect fishery activities. Any increase in recreational vessel activity in inshore and offshore waters of the GOM will likely increase the number of turtles taken by injury or mortality in vessel collisions. Recreational hook-and-line fisheries have been known to lethally take sea turtles. Future cooperation between NMFS and the states on these issues should help decrease take of sea turtles caused by recreational activities. NMFS will continue to work with coastal states to develop and refine ESA section 6 agreements and section 10 permits to enhance programs to quantify and mitigate these takes.

The fisheries described as occurring within the action area (see Section 3 and 4, Status of the Species and Environmental Baseline), are expected to continue as described into the foreseeable future. Fisheries in state waters along the Atlantic coast have been known to adversely affect threatened and endangered sea turtles. The past and present impacts of these fisheries have been discussed in the Environmental Baseline section of this opinion. NMFS is not aware of any proposed or anticipated changes in most of these fisheries that would substantially change the impacts each fishery has on the sea turtles covered by this opinion.

In addition to fisheries, NMFS is not aware of any proposed or anticipated changes in other human-related actions (e.g., poaching, habitat degradation) or natural conditions (e.g., over-abundance of land or sea predators, changes in oceanic conditions, etc.) that would substantially change the impacts that each threat has on the sea turtles covered by this opinion. Therefore, NMFS expects that the levels of take of sea turtles described for each of the fisheries and non-fisheries will continue at similar levels into the foreseeable future.

## 7 JEOPARDY ANALYSIS

The analyses conducted in the previous sections of this opinion serve to provide a basis to determine whether the proposed action would be likely to jeopardize the continued existence of any ESA-listed sea turtles. In Section 6 we have outlined how the proposed ALRT tests can affect sea turtles, and the extent of those effects in terms of estimates of the numbers of sea turtles captured or killed. Now we turn to an assessment of each species' response to this impact, in terms of overall population effects from the estimated take, and whether those effects of the proposed action, when considered in the context of the status of the species (Section 3), the environmental baseline (Section 5), and the cumulative effects (Section 7), will jeopardize the continued existence of the affected species.

"To jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and the recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02). Thus, in making this determination for each species, we must determine whether there will be a reduction in the reproduction, numbers, or distribution. Then,

if there is a reduction in one or more of these elements, we evaluate whether it will cause an appreciable reduction in the likelihood of both the survival and the recovery of the species.

#### **Effects of the Action on the Likelihood of Survival in the Wild**

This section analyzes the effects of the action on the likelihood of survival of each species in the wild. In the following analysis, we demonstrate that although some take is expected, the anticipated take of loggerhead and green sea turtles will not result in any measureable reductions in population numbers, and thus, will not appreciably increase the risk of extinction of these species in the wild.

##### *Reduction in numbers*

NMFS believes that the effects of the proposed action resulting in the take of 8 adult female loggerheads (5 lethal and 3 non-lethal) and 3 adult female green sea turtles (2 lethal and 1 non-lethal) over the lifetime of the action (until 2020); and the take of 84 loggerhead hatchlings annually (42 lethal and 42 non-lethal) and 46 green sea turtle hatchlings biennially (23 lethal and 23 non-lethal) is not likely to appreciably reduce the likelihood of survival of these species in the wild.

Non lethal takes are not expected to have any effect on population numbers of either species in the wild, given the lack of severity of the expected non lethal effects as described above.

For a population to remain stable, sea turtles must replace themselves through successful reproduction at least once over the course of their reproductive lives, and at least one offspring must survive to reproduce itself. If the hatchling survival rate to maturity is greater than the mortality rate of the population, the loss of breeding individuals would be replaced through recruitment of new breeding individuals from successful reproduction of non-taken loggerhead and green sea turtles. Although there is some concern about loggerhead population trends showing declines globally, the possible mortality of 5 females over the lifetime of the action is not expected to have an appreciable effect on the size and trends of loggerhead populations. Though the total sizes of loggerhead populations are not known, the number of nesting female loggerheads in the Atlantic is estimated to be between 32,000 and 56,000 individuals (NMFS and USFWS 2007b). Thus, the loss of 5 females through the year 2020 would not measurably affect the status or trends of the overall loggerhead population, which would be much larger than the number of females alone. The green sea turtle population is stable and showing signs of increasing at many population sites. A crude global estimate of the number of reproductive female green sea turtles was recently estimated between 108,000 to 150,521 individuals, but is likely an underestimate as it does not include all nesting areas (*Ibid.*) Green turtle nesting populations have been demonstrating continued strong growth in the western North Atlantic and the removal of 2 females over the duration of the ALRT tests until the year 2020 is not expected to have a measurable effect on the total numbers of green sea turtles or the trends in or stability of the population (NMFS and USFWS 2007b). The present population size and trend of the green turtle population is sufficiently large and stable for the persistence of these species even with the loss of 2 adult females from the proposed action through the year 2020.

Hatching mortality in the action area resulting from the proposed action is conservatively estimated at a rate of 16.7 percent (see numbers in following paragraph) due to the presence of lighted buoys immediately offshore of the nesting beach. Hatchling mortality rates are naturally high and the removal of hatchlings is not expected to measurably reduce the number of hatchlings expected to survive to adulthood in the wild. The survival rates of hatchlings to reproductive adults range from 1 in 100 to 1 in 1,000 hatchlings. Predation by fishes on hatchlings attracted to lighted buoys is not expected to result in a detectable decrease in survival rates to adulthood from this beach.

In summary, we believe the anticipated reduction in numbers of 5 adult female loggerheads and 2 adult female green sea turtles over the lifetime of the action (until 2020); and the lethal take of 42 loggerhead hatchlings annually and 23 green sea turtle hatchlings biennially will not appreciably reduce the likelihood of these species' survival.

#### *Reduction in reproduction*

All life stages are important to the survival of the species; however, it is important to note that individuals of one life stage are not equivalent to those of other life stages. For example, the take of male juveniles may affect survivorship and recruitment rates into the reproductive population in any given year, and yet not significantly reduce the reproductive potential of the population. However, the death of mature breeding females can have an immediate effect on the reproductive rate of the species. Sub-lethal effects on adult females may also reduce reproduction by hindering foraging success, as sufficient energy reserves are probably necessary for producing multiple clutches of eggs in a breeding year. Different age classes may be subject to relative rates of mortality, resilience, and overall effects of population dynamics.

The total number of nesting females of loggerheads in the Atlantic is estimated between 32,000 and 56,000 individuals (NMFS and USFWS 2007a). Loggerhead turtle nesting trends in the southeastern United States are showing signs of decline in the number of nests. A crude global estimate of the number of reproductive female green sea turtles was recently estimated between 108,000 to 150,521 individuals, but this number is likely an underestimate since it does not include all nesting areas (NMFS and USFWS 2007b). Green turtle nesting populations in the Atlantic are currently showing trends of stable or increasing numbers. Five loggerhead and 2 green adult female sea turtles may be removed over the duration of the ALRT tests until 2020; however, given the sizes of the nesting female populations of these species, the overall populations of these species are believed to be large enough to maintain viable reproductive populations and the action is not expected to result in a reduction in reproduction. The non-lethal takes anticipated from the proposed ALRT tests are not expected to impact the reproductive potential of any of the sea turtles. Therefore, we believe there will be no reduction in reproduction as a result of the anticipated takes of adult female turtles detailed above, and therefore it will not appreciable reduce the likelihood of these species' survival.

Individuals in earlier life stages are subject to many potential sources of mortality, both natural and human-induced, prior to reaching sexual maturity. Only a fraction of pelagic juvenile sea turtles are ever expected to contribute to the population through reproduction, and thus are not as valuable to the population as a breeding age adult. The loss of a certain number of hatchlings,

therefore, is less of a threat to the species' survival compared to an equal loss of sexually-mature adults. Therefore, we believe there will be no measurable reduction in reproduction as a result of the anticipated takes of hatchlings detailed above, and therefore it will not appreciably reduce the likelihood of the species' survival.

#### *Reduction in distribution*

Loggerhead and green sea turtles are widely distributed and highly migratory, and individuals may range throughout the GOM, Atlantic Ocean, and Caribbean Sea. While the potential mortality of 5 loggerheads and 2 green sea turtles over the lifetime of the ALRT tests would result in a minor reduction in numbers as stated above, the loss is not significant in terms of local, regional, or global distribution. Additionally, the non-lethal takes are not expected to affect the migrations or other distributional patterns of incidentally taken individuals. Hatchling mortality (84 loggerheads annually and 46 greens biennially) is not expected to significantly reduce the percentage of surviving hatchlings or future sea turtle distribution in the region. Therefore, we believe the anticipated takes will not affect the distribution of these species.

#### **Effects of the Action on the Likelihood of Recovery in the Wild Summary**

The above analysis on the effects of the action on the likelihood of each species' survival in the wild considered the current status of each species and effects of the numbers of lethal and/or non-lethal takes anticipated for each species. Although no change in distribution was concluded for any species, we concluded lethal takes would result in an instantaneous reduction in absolute population numbers, but the short-term, minimal reductions are not expected to appreciably reduce the likelihood of survival of any species in the wild. The following analysis considers the effects of the take on the likelihood of recovery in the wild. We consider the recovery objectives in the recovery plans prepared for each species that relate to population numbers that may be affected by the predicted reductions in numbers of sea turtles resulting from the proposed action.

The Atlantic recovery plan for the United States population of the loggerhead sea turtles (NMFS and USFWS 1991a), herein incorporated by reference, lists the following relevant recovery objective over a period of 25 continuous years:

- The adult female population in Florida is increasing and in North Carolina, South Carolina, and Georgia, it has returned to pre-listing nesting levels (NC = 800 nests/season; SC = 10,000 nests/season; GA = 2,000 nests/season).

The Atlantic recovery plan for the population of green sea turtles (NMFS and USFWS 1991b), herein incorporated by reference, lists the following relevant recovery objectives over a period of 25 continuous years:

- The level of nesting in Florida has increased to an average of 5,000 nests per year for at least 6 years; and
- A reduction in stage class mortality is reflected in higher counts of individuals on foraging grounds.

The potential lethal take of 5 loggerhead and 2 green mature female sea turtles over the lifetime of the ALRT tests will result in a minor reduction in overall population numbers in any given year. We have already determined this take is not likely to reduce population numbers over time due to current population sizes and expected recruitment. Non-lethal takes of sea turtles will not affect the adult female nesting population or number of nests per nesting season. Any turtles deterred from nesting due to these non-lethal takes are expected to nest in subsequent nesting attempts on Santa Rosa Island. Hatchling mortality (84 loggerheads annually and 46 greens biennially) is not expected to significantly reduce the percentage of surviving hatchlings or future sea turtle nesting activity on Santa Rosa Island. Thus, the effects of the proposed action will not result in an appreciable reduction in the likelihood of loggerhead or green sea turtle recovery in the wild.

## **8 CONCLUSION**

Our sea turtle analyses focused on the impacts and population response of loggerhead and green sea turtles in the Atlantic basin. However, the impact of the effects of the proposed action on the Atlantic populations must be directly linked to the global populations of the species, and the final jeopardy analysis is for the global populations as listed in the ESA. Because the proposed action is not likely to appreciably reduce the likelihood of survival and recovery of any Atlantic populations of sea turtles, it is our opinion that the proposed action is also not likely to jeopardize the continued existence of loggerhead and green sea turtles.

## **9 INCIDENTAL TAKE STATEMENT (ITS)**

Section 9 of the ESA and protective regulations issued pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the RPMs and terms and conditions of the ITS.

Section 7(b)(4)(c) of the ESA specifies that in order to provide an ITS for an endangered or threatened species of marine mammal, the taking must be authorized under section 101(a)(5) of the Marine Mammal Protection Act (MMPA). Since no incidental take of listed marine mammals is expected or has been authorized under section 101(a)(5) of the MMPA, no statement on incidental take of endangered whales is provided and no take is authorized. Nevertheless, USAF must immediately notify (within 24 hours, if communication is possible) the NMFS' Office of Protected Resources should a take of a listed marine mammal occur.

### **9.1 Anticipated Amount or Extent of Incidental Take**

Based on historical distribution data and observations from other projects and studies in the vicinity, loggerhead and green sea turtles in the action area may be taken by the proposed ALRT tests. Incidental take is anticipated; therefore, reasonable and prudent measures are necessary to minimize and monitor takes are established. NMFS anticipates incidental take of sea turtles according to the table below.

<b>Species</b>	<b>Adult Entanglement</b>		<b>Adult Entrapment</b>		<b>Hatchling Disorientation</b>	
	<i>Lethal</i>	<i>Non-lethal</i>	<i>Lethal</i>	<i>Non-lethal</i>	<i>Lethal</i>	<i>Non-lethal</i>
loggerhead	2 <sup>a</sup>	3 <sup>a</sup>	3 <sup>a</sup>	0	42 <sup>b</sup>	42 <sup>b</sup>
green	1 <sup>a</sup>	1 <sup>a</sup>	1 <sup>a</sup>	0	23 <sup>c</sup>	23 <sup>c</sup>

<sup>a</sup>Take estimated is over the lifetime of the action until 2020.

<sup>b</sup>Take is estimated annually.

<sup>c</sup>Take estimated is biennially because green sea turtles typically nest every other year on Santa Rosa Island.

## 9.2 Effect of the Take

NMFS has determined the anticipated level of incidental take specified in Section 9.1 is not likely to jeopardize the continued existence of loggerhead and green sea turtles.

## 9.3 Reasonable and Prudent Measures (RPMs)

Section 7(b)(4) of the ESA requires NMFS to issue a statement specifying the impact of any incidental take on listed species, which results from an agency action otherwise found to comply with section 7(a)(2) of the ESA. It also states that the RPMs necessary to minimize the impacts of take and the terms and conditions to implement those measures must be provided and must be followed to minimize those impacts. Only incidental taking by the federal agency or applicant that complies with the specified terms and conditions is authorized.

The RPMs and terms and conditions are specified as required by 50 CFR 402.14 (i)(1)(ii) and (iv) to document the incidental take by the proposed action and to minimize the impact of that take on sea turtles. These measures and terms and conditions are non-discretionary, and must be implemented by Eglin AFB in order for the protection of section 7(o)(2) to apply. Eglin AFB has a continuing duty to regulate the activity covered by this incidental take statement. If Eglin AFB fails to adhere to the terms and conditions of the incidental take statement through enforceable terms, and/or fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of the incidental take, Eglin AFB must report the progress of the action and its impact on the species to NMFS as specified in the ITS [50 CFR 402.14(i)(3)].

NMFS has determined that the following RPMs are necessary and appropriate to minimize impacts of the incidental take of sea turtles during the proposed action. The following RPMs and associated terms and conditions are established to implement these measures, and to document incidental takes. Only incidental takes that occur while these measures are in full implementation are authorized. These restrictions remain valid until reinitiation and conclusion of any subsequent section 7 consultation.

1. Eglin AFB must reduce the likelihood of injury or mortality resulting from entanglement or entrapment in ALRT test objects.
2. Eglin AFB must reduce the likelihood of hatchling disorientation resulting from lighted buoys in the ALRT test area.
3. Eglin must coordinate with the sea turtle stranding and salvage network and promptly notify NMFS Southeast Regional Office by telephone or email regarding all take of sea turtles resulting from ALRT tests activities consulted upon in this opinion.
4. Eglin AFB must provide NMFS with annual reports regarding the ALRT tests and interactions with protected species.

#### **9.4 Terms and Conditions**

In order to be exempt from liability for take prohibited by section 9 of the ESA, Eglin AFB must comply with the following terms and conditions, which implement the RPMs described above. These terms and conditions are non-discretionary.

The following terms and conditions implement RPM No. 1.

1. The floats used to mark the boundary of the test area and surface objects serving as targets in the water column must be checked daily within an hour of sunrise and within an hour of sunset to observe for potential protected species entanglement and ensure they are securely fastened to the seafloor.
2. All buoy lines must have as little slack as possible by providing a line length no longer than is sufficient to account for wave height at high tide.
3. All submerged objects must be checked daily for sea turtles.

The following terms and conditions implement RPM No. 2.

1. If any portion of the ALRT testing occurs during the period from 1 May through October 31, the Eglin NRS must conduct daily early morning sea turtle surveys to estimate hatching dates and mark any nests that may be impacted by ALRT activities once hatchlings emerge. Nesting surveys in the test area must begin 70 days prior to ALRT activities, or by May 1, whichever is later. Nesting surveys must continue through the end of the activities or through September 1, whichever is earlier. After this period nests must be checked based on anticipated hatching dates.
2. On the nights that ALRT activities will be conducted, the location of all nests within 0.8 km of the test area that were at or past incubation day 60 will be provided to test participants. On the nights that ALRT activities will be conducted, one testing participant will serve as an observer to be responsible for identifying signs of hatchling

sea turtles. The observer will be responsible for assuring that the project participants do not interfere with hatchling sea turtles, including disorientation from lights in the test area, by shielding all lights in the test area.

3. Between May 1 and October 31, all direct lighting of the beach and nearshore waters associated with the ALRT activities must be limited to the test area. If all sea turtle nests have hatched or been evaluated within 0.8 km, this restriction is not required.

The following terms and conditions implement both RPM No. 1 and RPM No. 2

1. For each ALRT test planned, buoys and their associated lighting will be placed in the water over the period of days it takes to place objects in the test field, and taken up first at the conclusion of the tests. Shortening the period of time lights and buoy lines are in the water will reduce the disorientation of hatchlings to the buoys that may result in predation, and will reduce the potential interaction of adult sea turtles with the buoy line.
2. On the nights that ALRT activities will be conducted, one testing participant must serve as an observer to be responsible for identifying signs of nesting adult or hatchling sea turtles. The observer must be responsible for assuring that the project participants do not interfere with female sea turtles making nesting attempts or impede the offshore swimming behavior of hatchling sea turtles.
3. All participants must receive conditions and restrictions associated with ALRT activities. Eglin AFB must provide an educational overview for the ALRT participants in the form of a presentation to explain the requirements.

The following terms and conditions implement RPM No. 3.

1. Between 1 May and 31 October, Eglin must provide a 24-hour contact to the test participants that will be available to respond to emergencies related to harm or injury to sea turtles and to answer questions related to endangered species and the testing activities (POC Bob Miller, 1-888-328-7351, or Bruce Hagedorn, 1-888-879-5420).
2. All injured or dead sea turtles must be reported to your local stranding network contacts. A list of sea turtle stranding responders is available at <http://www.sefsc.noaa.gov/seaturtleSTSSN.jsp>.
3. Any takes of listed species must be reported to the NMFS Southeast Regional Office within no more than 24 hours of the incident to: [takereport.nmfsser@noaa.gov](mailto:takereport.nmfsser@noaa.gov).

The following terms and conditions implement RPM No. 4.

1. Eglin AFB must submit an annual report to NMFS Southeast Regional Office regarding the ALRT test activities 60 days following the end of each calendar year. A report

describing the actions taken to implement the terms and conditions of this incidental take statement shall be provided. This report shall include the dates of the test activities, assessment and plan of action to address impacts to sea turtles and their habitats within the ALRT test area, and hatching and emerging success of nests. The annual report shall include the incidence of observed sea turtles, of false crawls, and comparison of the expected number of nests occurring in the test area with actual nests. Complete details of any takes must be included, including pertinent project details resulting in take, the species, age, disposition, and necropsy report if mortality resulted. Hardcopies of all annual reports must be submitted to the following address:

Assistant Regional Administrator for Protected Resources  
National Marine Fisheries Service  
263 13<sup>th</sup> Avenue South  
St. Petersburg, FL 33701

## **10 CONSERVATION RECOMMENDATIONS**

Section 7(a)(1) of the ESA directs federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

- Eglin AFB should conduct studies to look at the effects of ALRT activities on nesting beach utilization patterns on Santa Rosa Island, including the number of nests, false crawls, hatching success, and nesting trends in the ALRT test area.
- Due to the high level of testing and training activities on SRI, Eglin AFB should sponsor research programs to study the abundance, habitat use, and seasonal movement of threatened and endangered species and marine mammals in waters off the coast of the Florida Panhandle. It is recommended that Eglin AFB continue to sponsor monitoring efforts for sea turtle nesting and hatching success trends in the region. Research is recommended on identifying and characterizing juvenile foraging habitats, and tracking movements of different age classes between these habitats.
- Eglin should consider alternatives to minimize or shield the buoy lights to reduce sea turtle line of sight to the buoys to the greatest extent practicable. Reduction in illumination will reduce the disorientation of hatchlings to the buoys that may result in predation, and will reduce the potential interaction of adult sea turtles with the buoy line.
- Eglin AFB should conduct tests outside of the nesting and hatching season of sea turtles whenever possible.

In order for NMFS to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, NMFS requests notification of the implementation of

any conservation recommendations.

#### **11 REINITIATION OF CONSULTATION**

This concludes formal consultation on the proposed Eglin AFB ALRT tests on Santa Rosa Island, Florida. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) The amount or extent of taking specified in the ITS is exceeded; (2) new information reveals effects of the action may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) the identified action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in the biological opinion; or (4) a new species is listed or critical habitat designated that may be affected by the identified action.

**APPENDIX A. USFWS REASONABLE AND PRUDENT MEASURES FOR ALRT TESTS****Reasonable and Prudent Measures**

The Service [USFWS] believes the following reasonable and prudent measures (RPMs) are necessary and appropriate to minimize take of sea turtles as a result of the ALRT activities on the restricted GOM beachfront, Santa Rosa Island controlled by Eglin.

1. Barrier fence shall be installed and maintained in place at the test site when the ALRT activities are conducted during sea turtle nesting season.
2. Personnel movement associated with the ALRT activities shall follow all applicable restrictions to movement along the beachfront as provided verbally, written, or indicated on the ground.
3. Daily surveys for nesting sea turtles shall be conducted if the ALRT activities are conducted during the sea turtle nesting season. Any nests that could be affected by the ALRT project shall be relocated.
4. Participants in the ALRT activities shall be informed and cognizant of the potential effects of human presence and the test activities on sea turtles and behave as instructed.
5. The boundaries of Test Site A-15 shall be clearly delineated when ALRT activities are conducted during the sea turtle nesting season.
6. Eglin shall require the participants of the ALRT activities to designate an observer responsible for identifying signs of sea turtle activity when test activities are to take place at night during the sea turtle nesting season.
7. Eglin shall ensure that beach and dune habitats impaired by the ALRT activities are appropriately restored and maintained per the Santa Rosa Island Programmatic consultation.
8. Eglin shall continue to conduct daily sea turtle nesting surveys on all the beaches under their management during the sea turtle nesting season in accordance with State of Florida permits and protocol.
9. Eglin shall ensure that the terms and conditions are accomplished and completed as detailed in this incidental take statement, including completion of reporting requirements.

**Terms and Conditions**

In order to be exempt from the prohibitions of section 9 of the Endangered Species Act, Eglin shall comply with the following terms and conditions which implement the reasonable and prudent measures described above, and outline required reporting and monitoring requirements.

These terms and conditions are non-discretionary.

**1. Species Protection**

**A.** A barrier fence shall be installed when the test array is placed on the beach during the period from May 1 through October 31 or until the last nest within the zone of influence has hatched, to direct nesting sea turtles away from the test area into adjacent beaches that are devoid of obstacles. The fence shall be installed so that sea turtles are unable to become entangled or trapped in the fence or be able to crawl over the fence further into the test area. The fence shall be installed for the duration of the ALRT activities, or if nightly, by 12 hour after sunset and until the next morning after the daily sea turtle surveys and nest protection activities are completed.

**B.** Daily early morning surveys shall be required if any portion of the ALRT activities occurs during the period from May 1 through October 3, or until the last nest within the zone of influence has hatched. Nesting surveys shall be initiated 70 days prior to ALRT activities or by May 1, whichever is later. Nesting surveys shall continue through the end of the activities or through September 1, whichever is earlier. Hatching and emerging success monitoring shall involve checking nests beyond the completion date of the daily early morning nesting surveys. If nests are laid in areas where they may be affected by the ALRT activities, eggs must be relocated per the following requirements.

1. Nesting surveys and egg relocations shall only be conducted by personnel with prior experience and training in nest survey and egg relocation procedures. Surveyors are to have a valid Florida Fish and Wildlife Conservation Commission permit. Nest surveys are to be conducted daily between one-half hour before sunrise and 9 a.m. Surveys are to be performed in such a manner so as to ensure that ALRT activity does not occur in any location prior to completion of the necessary sea turtle protection measures.

2. All nests within Test Site A-1 5 shall be relocated to between Eglin Index Nesting Beach Survey markers 3.5 and 5.0. Nests requiring relocation must be moved no later than 9 a.m. the morning following deposition. Relocated nests shall not be placed in organized groupings and randomly staggered along the length and width of the beach so that they do not experience daily inundation by high tides, subject to seasonal severe erosion, or artificial lighting.

3. Nests deposited within areas where ALRT activities have ceased or will not occur for 70 days shall be marked and left in situ unless other factors threaten the success of the nest. The nests shall be marked by installation of an on-beach marker at the nest site and a secondary marker at a point landward as possible to assure that future location of the nest will be possible should the on-beach marker be lost.

**C.** On the nights the ALRT activities will be conducted during the period from May 1 to October 31 or until the last nest within the zone of influence has hatched, the following shall be implemented.

1. Eglin Natural Resources Branch shall notify and provide sea turtle nest location information to the ALRT participants about each nest that is a maximum  $\frac{1}{2}$  mile away from Test Site A-15 and is at or past incubation day 60. Participants shall avoid marked sea turtle nests by at least 15.2 m during the ALRT activities.
  2. The east and west boundaries of the ALRT activities shall be considered as the same as the Test Site A-15 boundaries and are to be clearly delineated either on the ground or provided in a map to all ALRT participants. If all sea turtle nests have hatched or been evaluated up to  $\frac{1}{2}$  mile away, this restriction is not required. If the boundaries of the Test Site A-15 are marked on the ground, Eglin Natural Resources Branch or their designee shall check them daily during the ALRT activities. Missing posts or other marking material shall be replaced within 24 hours of discovery. If all sea turtle nests have hatched or been evaluated up to  $\frac{1}{2}$  mile away, this restriction is not required.
  3. One ALRT participant shall be designated as an observer. The observer shall be responsible for identifying signs of nesting or hatchling sea turtles, and assuring that the test participants do not interfere with nesting sea turtles or impede hatchling sea turtles from emerging from the nest and crawling to the GOM, or obscure signs of sea turtle activity.
  4. If an adult sea turtle is observed on the beach while the ALRT activities is ongoing and an Eglin Natural Resources Branch observer is not onsite, participants shall remain as quiet as possible allowing the turtle to continue her activities. All effort shall be made not to obscure the turtle crawl or nest area. The morning nesting survey shall be responsible for relocating the nest during the following morning. If the sea turtle becomes or appears to be disoriented, actions to ameliorate the impacts will be accomplished immediately. Eglin Natural Resources Branch shall be notified of the occurrence by 9:00 a.m. the next day.
  5. If hatchling turtles are observed on the beach and an Eglin Natural Resources Branch observer is not onsite, all efforts shall be made not to disturb hatchling movement. Efforts shall be made not to obscure the turtle crawls or the nest from where they emerged. If the hatchlings become or appear to be disoriented, actions to meliorate the impacts will be accomplished immediately. Eglin Natural Resources Branch shall be notified of the occurrence by 9:00 a.m. the next day.
  6. Eglin shall provide a 24-hour contact to the ALRT participants that would be available to respond or to handle emergencies related to harm or injury to sea turtles, and to answer questions related to endangered species and the testing activities.
- D.** If a turtle crawl is seen on the beach during daytime following the daily survey with no associated marked nest, the appropriate Eglin Natural Resources Branch contact, their designee, or the 24-hour contact shall be immediately notified. Care shall be taken not to disturb the crawl and/or nest site.
- E.** Between May 1 and October 3 or until the last nest within the zone of influence has hatched, all direct lighting of the beach and near shore waters associated with the ALRT activities shall be

limited to Test Site A- 15. If all sea turtle nests have hatched or been evaluated up to M mile, this restriction is not required.

F. Conditions and restrictions to the ALRT activities and the Coastal Educational handbook shall be provided to all participants.

**2. Habitat Protection, Training Impact Evaluation, Restoration, and Maintenance of Habitats**

A. Vehicles (such as ATVs or Polaris) may be used to site targets but no equipment or vehicles shall be allowed within vegetated areas or dunes that are 5 feet or higher in elevation.

B. No ALRT participants shall be allowed on the dunes, vegetated or unvegetated, that are 1.5 m or higher in elevation.

C. Within 12 hours following ALRT activities, Eglin Natural Resources Branch shall conduct an assessment of the impacts to sea turtles and beach and dune habitats. Within 30 days following the assessment, Eglin is to provide the Fish and Wildlife Service the findings of the assessment, recommendations for habitat restoration, and/or changes in future ALRT activities to rectify or minimize the impacts, if possible. If impacts are determined to be minimal or non-existent, the assessments can be eliminated after 2008.

D. Eglin shall ensure that beach and dune habitats impaired by the ALRT activities are appropriately restored and maintained per the Santa Rosa Island Programmatic consultation dated December 1, 2005.

E. Informing the ALRT Project Participants about Habitat Protection.

1. Eglin AFB shall ensure that ALRT participants understand the need to protect beach and dune habitat during the test activities.

2. Eglin AFB shall ensure that the protection of habitat will be implemented by the marking of the habitat boundary, posting no entry areas. and/or providing verbal and written communication to the ALRT participants.

**3. Species Monitoring**

A. Eglin AFB shall continue implementing their sea turtle nesting survey program on all beaches under their management in accordance with Florida Fish and Wildlife Conservation Commission permit requirements and with Terms and Conditions in the Service's biological opinions on Eglin's INRMP dated March 26, 2002 and the Santa Rosa Island Mission Programmatic dated December 1, 2005, except as noted below.

Daily early morning sea turtle nest surveys are to be conducted between May 1 and September 1. Frequency of hatching and emerging success monitoring after September 1, is to involve checking nests based on expected nest hatch dates.

**B.** Eglin shall continue to participate in the State of Florida's Sea Turtle Stranding and Salvage Network. All strandings are to include geographic position data collection and the data is to be incorporated into Eglin's geographic information system.

**C.** Eglin shall continue to participate and implement predator control on Santa Rosa Island to ensure depredation rates of sea turtles and their nests is maintained at a rate of less than 5 percent annually.

**4. Reporting**

**A.** All Eglin military and civilian personnel involved in any aspect of the ALRT activities and events on Santa Rosa Island shall be notified that upon locating a sea turtle adult, hatchling, or egg that has been harmed or destroyed, to contact the Eglin Natural Resources Branch. Eglin Natural Resources Branch, their designee, or the 24-hour contact shall be responsible for notifying the Florida Fish and Wildlife Conservation Commission Stranding and Salvage Network by Pager: 1-800-241-4653, ID#274-4867; and the U.S. Fish and Wildlife Service Office located in Panama City, Florida at (850) 769-0552. Care shall be taken in handling injured turtles or eggs to ensure effective treatment or disposition, and in handling dead specimens to preserve biological materials in the best possible state for later analysis.

**B.** A report describing the actions taken to implement the terms and conditions of this incidental take statement shall be submitted to the Project Leader, U.S. Fish and Wildlife Service, 1601 Balboa Avenue, Panama City, Florida, 32405, within 60 days of the end of the calendar year for each calendar year in which the ALRT activities are conducted. This report shall include the dates of the test activities, assessment and plan of action to address impacts to sea turtles and their habitats within Test Site A-15 on Santa Rosa Island, and hatching and emerging success of nests. If ALRT activities do not take place, a negative report shall be required, with sea turtle nesting survey data for the year. Only if the ALRT activities on Santa Rosa Island are permanently stopped shall the above conditions not be required.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. The Service believes that no more than 15 acres of habitat for nesting loggerhead, green, leatherback, and Kemp's ridley sea turtles will be incidentally taken. If during the course of the action this level is exceeded, such incidental take represents new information requiring initiation of consultation and review of the reasonable and prudent measures provided. The Corps must immediately provide an explanation of the causes of the taking and review with the service the need for possible modification of the reasonable and prudent measures.

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**APPENDIX D**

**PUBLIC AND STATE AGENCY COMMENTS**



**Nunley Jerry M Mr CTR USAF 96 CEG/CEVSN**

**From:** Shreve Rhena L CTR USAF 96 CEG/CEVH  
**Sent:** Thursday, August 09, 2007 2:21 PM  
**To:** Nunley Jerry M Mr CTR USAF 96 CEG/CEVSN  
**Subject:** RE: ALRT: COBRA

Mike,

Mike,

You are correct; a formal consultation with the SHPO will not be required for this project. The SHPO was made aware of the undertaking during an informal discussion in our office and agrees that a formal consultation is not necessary. Their office will have an opportunity to comment and address any concerns that they may have during the clearinghouse review.

Thanks  
Lynn

-----Original Message-----

From: Nunley Jerry M Mr CTR USAF 96 CEG/CEVSN  
Sent: Monday, August 06, 2007 3:54 PM  
To: Shreve Rhena L CTR USAF 96 CEG/CEVH  
Subject: RE: ALRT: COBRA

Lynn,

I believe you spoke with Marty about this project and that consultation would not be required; however, can you confirm this? The document will be going through the clearinghouse in a couple of weeks and will get a review there for cultural concerns, right? The prelim draft is attached for your information.

Thanks!  
Mike

-----Original Message-----

From: Jordan Teresa A CIV USAF 96 CEG/CEVCE  
Sent: Monday, August 06, 2007 1:35 PM  
To: Miller Bob CIV USAF 96 CEG/CEVSNW; Benson Carl B 2dLt MIL USAF 46 TS/OGEE  
Cc: Nunley Jerry M Mr CTR USAF 96 CEG/CEVSN; Shreve Rhena L CTR USAF 96 CEG/CEVH; Newberry Martin R CIV USAF 46 TS/OGEX; 'Holloway, John H Jr CIV NSWC PC'; Bolduc Paul R Dr CIV USAF 96 CEG/CEVSP  
Subject: RE: ALRT: COBRA

Well said Bob. To date, none of these tests (with regard to anything in the water) has been approved by the USACE. That's why SAIC is working on the application package to go to the state and the Corps for approval. Nothing can be done in the water (legally) without that approval. That's the water cog in the "environmental" wheel.

Teresa Jordan

-----Original Message-----

From: Miller Bob CIV USAF 96 CEG/CEVSNW  
Sent: Monday, August 06, 2007 11:05 AM  
To: Benson Carl B 2dLt MIL USAF 46 TS/OGEE  
Cc: Nunley Jerry M Mr CTR USAF 96 CEG/CEVSN; Jordan Teresa A CIV USAF 96 CEG/CEVCE; Shreve Rhena L CTR USAF 96 CEG/CEVH; Newberry Martin R CIV USAF 46 TS/OGEX; 'Holloway, John H Jr CIV NSWC PC'; Bolduc Paul R Dr CIV USAF 96 CEG/CEVSP  
Subject: RE: ALRT: COBRA

Lt Benson

The one thing you need to understand is the Environmental Analysis Impact Process (EAIP) which requires anyone or activity conducting training/testing on Eglin must complete an AF 813 and have it signed prior to completing any action. This AF813 must completely describe the action to take place. The final signed 813 may have other concerns besides Natural Resources. We are but one cog on the wheel that reviews these documents. There are other specialties (i.e. water resources and cultural resources) that may have concerns or permitting issues. That being said everything I have describe below along with the buoys and sensors have been approved through Natural Resources, however, permitting for water compliance and cultural resources may also be required prior to any actions taking place. Teresa Jordan is the POC for water resources and Lynn Shreve is the POC for cultural. I have cc'd both on this e-mail. Natural Resources are in the process of completing the approval for the items not described in the original 813 request. This is a long and lengthy process but when it is completed you should be able to complete your testing with some conditions. I hope this helps and if Teresa or Lynn has any issues or concerns they will respond.

Thanks

Bob Miller

Endangered Species Biologist  
Natural Resources Branch  
Eglin AFB  
107 Highway 85 North  
Niceville, FL 32578  
850-883-1153  
bob.miller@eglin.af.mil

-----Original Message-----

From: Benson Carl B 2dLt MIL USAF 46 TS/OGEE  
Sent: Monday, August 06, 2007 9:32 AM  
To: Miller Bob CIV USAF 96 CEG/CEVSNW  
Cc: Nunley Jerry M Mr CTR USAF 96 CEG/CEVSN  
Subject: FW: ALRT: COBRA

Bob

Are the sensors and buoys described below by John Holloway also allowed in our water array?

Thanks

CARL B. BENSON, 2Lt, USAF  
Defensive Systems Test Engineer  
CHICKEN LITTLE  
46th Test Squadron  
(850) 882-5480

"What would you attempt to do,  
if you knew you couldn't fail?"

-----Original Message-----

From: Holloway, John H Jr CIV NSWC PC [mailto:[john.holloway@navy.mil](mailto:john.holloway@navy.mil)]  
Sent: Saturday, August 04, 2007 11:08 AM  
To: Benson Carl B 2dLt MIL USAF 46 TS/OGEE  
Subject: RE: ALRT: COBRA

Carl,

When I sat in the meeting in Feb, my understanding was that we could put out our environmental sensors and a few buoys. I hope we are still allowed to do this as we really need an understanding of the water characteristics.

Vr/  
John

-----Original Message-----

From: Benson Carl B 2dLt MIL USAF 46 TS/OGEE [mailto:[carl.benson@eglin.af.mil](mailto:carl.benson@eglin.af.mil)]  
Sent: Thursday, August 02, 2007 1:22 PM  
To: Holloway, John H Jr CIV NSWC PC  
Cc: Newberry Martin R CIV USAF 46 TS/OGEX  
Subject: FW: ALRT: COBRA

What we are approved to do on A-15 is listed below

CARL B. BENSON, 2Lt, USAF  
Defensive Systems Test Engineer  
CHICKEN LITTLE  
46th Test Squadron  
(850) 882-5480

"What would you attempt to do,  
if you knew you couldn't fail?"

-----Original Message-----

From: Miller Bob CIV USAF 96 CEG/CEVSNW  
Sent: Thursday, August 02, 2007 12:58 PM  
To: Benson Carl B 2dLt MIL USAF 46 TS/OGEE  
Cc: Nunley Jerry M Mr CTR USAF 96 CEG/CEVSN; Newberry Martin R CIV USAF  
46 TS/OGEX; Smith Kristin CTR USAF 96 CEG/CEVSNW; Knight Kelly E CTR USAF 96 CEG/CEVSNW;  
Hagedorn Bruce W CIV USAF 96 CEG/CEVSNW; Seiber Stephen M CIV USAF 96 CEG/CEVSN; Jordan  
Teresa A CIV USAF 96 CEG/CEVCE  
Subject: RE: ALRT: COBRA

Lt Benson

The only array authorized at this time are the PDM-1M in the surf zone and M20 anti-tank mines on the beach, as well as, concertina wire on the beach with some type of barrier around it to prevent entanglement.

Currently the array that is set-up between the sound and the beach is also OK. This includes the concrete blocks and tanglefoot that is well north of the primary dune line. There is nothing other than the PDM-1M mines authorized in the water. There is also nothing other than mines and the concertina wire authorized on the beach south of the primary dune line. The array is also to be no wider than 100 meters across. I have attached the biological assessment and the biological opinion for your review. Please note the avoidance and minimization measures in the BA and the terms and conditions in the BO. These conditions are non-discretionary and Eglin must comply. I would appreciate someone from your office to coordinate with the Natural Resources Section the day of or the day before set up so we can mark the area for the array.

The only benefit there is to conducting the survey outside of the turtle season vise within the turtle season (May 1 through October 31) is that the concertina wire would not have to be fenced on the beach. Sea turtles are found in the water year around yet only nest during the months of May through October. We are currently still working on the section 7 consultation for the work in the water and the other obstacles on the beach. We are awaiting the completed draft environmental assessment before finalizing our biological assessments with the USFWS and the NMFS. I also believe we are still working on finalizing the works in the water permitting from the Florida Department of Environmental Protection. If you have any questions or concerns please feel free to contact me.

Thanks

Bob Miller

Endangered Species Biologist  
Natural Resources Branch

Eglin AFB  
107 Highway 85 North  
Niceville, FL 32578  
850-883-1153  
bob.miller@eglin.af.mil

-----Original Message-----

From: Benson Carl B 2dLt MIL USAF 46 TS/OGEE  
Sent: Wednesday, August 01, 2007 4:19 PM  
To: Miller Bob CIV USAF 96 CEG/CEVSNW  
Cc: Nunley Jerry M Mr CTR USAF 96 CEG/CEVSN; Newbery Martin R CIV USAF  
46 TS/OGEX  
Subject: ALRT: COBRA

Bob,

We are going through the motions to run another COBRA test. This is different from the last test because it will incorporate a passive system instead of an active system and will be completely eye safe. My understanding is that we can setup our mines on the beach and in the water as before and also setup a row of concertina wire as long as we put a silt fence around it. This test will most likely take place mid-late September which falls within turtle season. Should the mission get postponed until after turtle season are we allowed to set up the same array that we had before turtle season? The same array would include a row of hedge hogs, sea urchins, concertina wire, and tangle foot along with mines in the surf zone. Please correct me if I am wrong so that there is no miscommunications.

Thanks

CARL B. BENSON, 2Lt, USAF  
Defensive Systems Test Engineer  
CHICKEN LITTLE  
46th Test Squadron  
(850) 882-5480

"What would you attempt to do,  
if you knew you couldn't fail?"

**Response to Comments for  
Advanced Littoral Reconnaissance Technologies (ALRT) Project  
at Eglin Air Force Base, Florida, Draft Environmental Assessment  
and Finding of No Significant Impact**

A public notice was published in the *Northwest Florida Daily News* on Sep. 23, 2007 to disclose completion of the Draft EA, selection of the preferred alternative, and request for comments during the 15-day pre-decisional comment period.

The 15-day comment period ended on Oct. 17<sup>th</sup>, with the comments required to this office not later than Oct. 22<sup>nd</sup>, 2007. No comments were received during this period.

//Signed//  
Mike Spaits  
Public Information Specialist



## Florida Department of Environmental Protection

Marjory Stoneman Douglas Building  
3900 Commonwealth Boulevard  
Tallahassee, Florida 32399-3000

Charlie Crist  
Governor

Jeff Kotkamp  
Lt. Governor

Michael W. Sobe  
Secretary

November 15, 2007

Mr. J. Mike Nunley, Project Manager  
Science Applications International Corporation  
1140 North Eglin Parkway  
Shalimar, FL 32579

RE: Department of the Air Force - Draft Environmental Assessment, Advanced Littoral Reconnaissance Technologies (ALRT) Project at Eglin Air Force Base - Santa Rosa County, Florida.  
SAI # FL200709203772C

Dear Mr. Nunley:

The Florida State Clearinghouse, pursuant to Presidential Executive Order 12372, Gubernatorial Executive Order 95-359, the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended, and the National Environmental Policy Act, 42 U.S.C. §§ 4321, 4331-4335, 4341-4347, as amended, has coordinated a review of the referenced Draft Environmental Assessment (DEA).

Based on the information contained in the DEA and state agency comments, the state has determined that the proposed federal activities are consistent with the Florida Coastal Management Program (FCMP).

Thank you for the opportunity to review the proposed project. Should you have any questions regarding this letter, please contact Ms. Lauren P. Milligan at (850) 245-2170.

Yours sincerely,

Sally B. Mann, Director  
Office of Intergovernmental Programs

SBM/lm

"More Protection, Less Process"  
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**APPENDIX E**

**COASTAL ZONE MANAGEMENT ACT (CZMA)**

**DETERMINATION**



**FEDERAL AGENCY COASTAL ZONE MANAGEMENT ACT (CZMA)  
CONSISTENCY DETERMINATION**

**Introduction**

This document provides the State of Florida with the U.S. Air Force's Consistency Determination under CZMA Section 307 and 15 C.F.R. Part 930 sub-part C. The information in this Consistency Determination is provided pursuant to 15 C.F.R. Section 930.39 and Section 307 of the Coastal Zone Management Act, 16 U.S.C. § 1456, as amended, and its implementing regulations at 15 C.F.R. Part 930.

This federal consistency determination addresses the Proposed Action associated with Advanced Littoral Reconnaissance Technologies (ALRT) testing activities on Santa Rosa Island (SRI), Eglin Air Force Base (AFB), Florida (Figure 1).

**Proposed Federal agency action:**

The Proposed Action would involve the collection of both passive and active multi-spectral seeker/sensor signature data of obstacles, simulated mines and barricades in inland environments, and littoral waters from several possible systems and airframes (Figures 2 and 3). In this document obstacles are defined as objects placed in the water or on the beach that still allow marine species complete access to and from the shore. These items can be (but not limited to) PDM-1 and PDM-2 inert mines (Figures 4-6), structural hedgehogs (Figure 7), tetrahedrons, and concrete cubes. Barricades are items that would interfere with access to and from the beach. These items typically are 15 – 31 meters (m) (50 – 100 feet [ft]) long sections and can be (but not limited to) concertina wire (Figure 8), tanglefoot (Figure 9), and structural sea urchins (obstacles placed close together that act as a barricade) (Figure 10).

The Advanced Littoral Reconnaissance Technologies (ALRT) project at Naval Surface Warfare Center – Panama City (NSWC-PC) plans to test various active sensors and passive sensors combined with laser illuminators. The laser illuminators would consist of varying types of lasers including Nd:YAG/ Nd:YLF (neodymium-doped yttrium aluminum garnet/ yttrium lithium fluoride), Nd:YAG/ Nd:YLF OPO (neodymium-doped yttrium aluminum garnet/ yttrium lithium fluoride with Optical Parametric Oscillator module) shifted, laser diode array illuminators, all of various wavelengths, and other experimental sensors and/or illuminators for future systems. The various sensors would consist of both narrow and wide fields of view and be flown in an aircraft usually 152 m (500 ft) to 914 m (3,000 ft) above the targets. The ALRT team would utilize three areas of Test Area A-15: the Gulf coastal beach area (out to 4-m [13-ft] depths), the Santa Rosa Sound (out to 4-m [13-ft] depths), and an intermediate area between the two coastal areas. To create a realistic threat scenario, the target area would include inert mines, obstacles, and barricades on the island and in the water. Personnel would install the targets at Test Area A-15 over a three- to four-day period in a fashion to simulate actual mine layouts. After installation, mission flights would commence, during which a sensor

system would be flown over the targets. While over the targets, the passive sensors would collect data and any laser subsystems would scan the target fields both over the water and over the land. Testing could occur at any time of the year, day or night. Upon test completion, personnel would remove targets from the test site over a two- to three-day period. The mines and obstacles would be on the beach and in the water for no longer than an estimated two weeks per test event.

#### *Minefield, Barrier and Obstacle Layouts*

Activities associated with testing include placement of inert mines and obstacles (such as concrete blocks and concertina wire) on the beach front. M20 anti-tank mines, PDM-1M anti-tank/anti-landing craft mines, or other similar mines that are approximately 14 inches in diameter plus base plate accessories as required, would be used in the surf zone at 0.5-m (1.64-ft) depths.

The minefield, barrier, and obstacle layouts required for this test include linear patterned and random scattered mines, barriers, and obstacles on the beach and in the water. Figure 3 illustrates the proposed minefield, barrier, and obstacle layout. Personnel would place inert mines in each area to simulate actual mine layouts in accordance with current available doctrine. To minimize the movement or loss of mines, each individual target would be anchored, tied together, inventoried, and monitored for proper set-up. These devices would be positioned near the edge of the water or in the water up to 4 m (13 ft) deep and anchored primarily with screw anchors or occasionally poles jetted into the sand. To raise and lower some of the heavier targets, a boat/barge with equipment would be necessary. A scuba diver would then secure each mine with a screw anchor.

Mine positions would be recorded using a hand-held differential GPS system at the time of installation in the target field. Personnel would record this "truth data" on the minefield layout chart and use it to score the actual data results to determine horizontal location accuracy. For reference, areas of Test Site A-15 to be flown over would be marked on the perimeter with 1.22 m<sup>2</sup> (4 ft<sup>2</sup>) painted aluminum panels and/or small lights (pointed up). These panels and lights would remain in place throughout the flight series. For night operations, strobe lights would be set up to direct the flight paths.

The inert mines would include M20 inert anti-tank, PDM-1M inert anti-landing craft, and PDM-2 inert anti-landing mines (Figures 4 through 6). These mine targets are representative of the different materials and types of anti-tank mines encountered in littoral scenarios and are readily available from the current Navy project inventory. They would also provide a representative sampling of the sizes and spectral signatures encountered in real-world scenarios. Obstacles would include floats and buoys, scientific instrumentation, tetrahedrons, structural hedgehogs (Figure 7), and concrete cubes 1.22 m<sup>3</sup> (4 ft<sup>3</sup>). Barricades would include concertina wire or wire rolls that could simulate concertina wire (Figure 8), tanglefoot barbed wire fencing (Figure 9), and structural sea urchins, which are three pieces of steel rebar welded in a conical shape (Figure 10). These targets would be placed on the beach and in the surf zone. The obstacles and barricades would not be longer than 100 m (328 ft); however, M20 inert anti-tank mines

may be scattered around the other items but would be located within the potential placement locations (Figure 2). Similar barricades or obstacles may be used both in the surf zone and on the beach. The entire area would never be totally filled, only various small sections of the total area would have typical minefield layouts at any given time. There would not be more items emplaced than current inventory allotments allow. Those inventories consist of up to 1000 mine-like objects varying in size from a few inches up to 36 inches in diameter and other targets such as buoys varying in size up to 36 inches, marker panels typically 4 ft<sup>2</sup>, various wire obstacles, various light to medium anti-landing obstacles, and various instrumentation for monitoring the environment. After the objects are put into place, positional surveys are conducted. For in-water objects, a hand-held GPS would be used to locate the objects by either walking into the water or using a boat to float out. Also, divers would check the targets daily to verify that the objects are there and clean them off. During these daily checks, divers would survey the area for protected marine species in the area.

The Proposed Action would also include the items detailed below:

- Floats and lights to mark the boundary of the test field area and floats throughout the target field area to serve as additional targets.
- A trailer on the beach to capture data from water clarity collection devices.
- Water quality measurement instrumentation positioned on a tall screw anchor (four total). These devices would be positioned around the edge of the target field and would be anchored to screw anchors or to poles jetted into the sand in up to 3 m (9.8 ft) deep water.
- Type 2 inert anti-landing craft mines at 2- to 3-m (6.6- to 9.8-ft) depths and 15 m (49.2 ft) apart.
- Structural hedgehogs (1 m<sup>3</sup> [3.3 ft<sup>3</sup>]) in approximately 1.3-m (4.3-ft) depths with 10 m (32.8 ft) spacing.
- Structural sea urchins (2 m [6.6 ft] tall) in 0.9-m (2.95-ft) depths and 100 m (328 ft) long.
- Concertina wire or wire rolls manufactured to simulate concertina wire in .3 m (1 ft) of water and 100 m (328 ft) long.
- Additional anti-landing craft mines in the water, in particular at 0.6-m (2-ft), 1.1-m (3.6-ft), and 2-m (6.5-ft) depths at 6 to 10 m (19.7 to 32.8 ft) apart.
- A tangle-foot barbed wire array placed on the beach, 10 m (32.8 ft) from the water edge and 100 m (328 ft) long.
- An additional row of 1 m<sup>3</sup> (3.3 ft<sup>3</sup>) structural hedgehogs 30 m (98.4 ft) from the water edge.
- A row of anti-tank mines buried in the sand by hand.

The array would remain in place at night, with reflective buoys marking the area to keep boat traffic out. As soon as the last flight test is complete, personnel would remove all of the mines, obstacles, and barricades and account for their locations.

**Federal Review**

Statutes addressed as part of the Florida Coastal Zone Management Program consistency review and considered in the analysis of the Proposed Action are discussed in the following table.

Pursuant to 15 C.F.R. § 930.41, the Florida State Clearinghouse has 60 days from receipt of this document in which to concur with, or object to, this Consistency Determination, or to request an extension, in writing, under 15 C.F.R. § 930.41(b). Florida's concurrence will be presumed if Eglin AFB does not receive its response on the 60th day from receipt of this determination.

**Florida Coastal Management Program Consistency Review**

<b>Statute</b>	<b>Consistency</b>	<b>Scope</b>
<i>Chapter 161 Beach and Shore Preservation</i>	The Proposed Action would not affect beach and shore management, specifically as it pertains to: <ul style="list-style-type: none"> <li>• The Coastal Construction Permit Program.</li> <li>• The Coastal Construction Control Line (CCCL) Permit Program.</li> <li>• The Coastal Zone Protection Program.</li> </ul>	Authorizes the Bureau of Beaches and Coastal Systems within DEP to regulate construction on or seaward of the states' beaches.
<i>Chapter 163, Part II Growth Policy; County and Municipal Planning; Land Development Regulation</i>	The Proposed Action would not affect local government comprehensive plans.	Requires local governments to prepare, adopt, and implement comprehensive plans that encourage the most appropriate use of land and natural resources in a manner consistent with the public interest.
<i>Chapter 186 State and Regional Planning</i>	The Proposed Action would not affect state plans for water use, land development or transportation.	Details state-level planning efforts. Requires the development of special statewide plans governing water use, land development, and transportation.
<i>Chapter 252 Emergency Management</i>	The Proposed Action would not affect the state's vulnerability to natural disasters.  The Proposed Action would not affect emergency response and evacuation procedures.	Provides for planning and implementation of the state's response to, efforts to recover from, and the mitigation of natural and manmade disasters.
<i>Chapter 253 State Lands</i>	The Proposed Action would occur on federal property as well as sovereign submerged lands.  A Joint Coastal Permit would be obtained prior to any potential impact to state submerged land. Eglin's Water Resources Section, 96 <sup>th</sup> CEG/CEVCE, would coordinate all applicable permits in accordance with the Florida Administrative Code (FAC).  While the Proposed action would cause temporary and localized impact to the water column and submerged land, the effects would be minor and infrequent.  Therefore, the Proposed Action would be consistent with Florida's statutes and regulations regarding state land.	Addresses the state's administration of public lands and property of this state and provides direction regarding the acquisition, disposal, and management of all state lands.
<i>Chapter 258 State Parks and Preserves</i>	The Proposed Action would not affect state parks, recreational areas and aquatic	Addresses administration and management of state parks and

	preserves.	preserves.
Chapter 259 <i>Land Acquisition for Conservation or Recreation</i>	The Proposed Action would not affect tourism and/or outdoor recreation.	Authorizes acquisition of environmentally endangered lands and outdoor recreation lands.
Chapter 260 <i>Recreational Trails System</i>	The Proposed Action would not include the acquisition of land and would not affect the Greenways and Trails Program.	Authorizes acquisition of land to create a recreational trails system and to facilitate management of the system.
Chapter 375 <i>Multipurpose Outdoor Recreation; Land Acquisition, Management, and Conservation</i>	The Proposed Action would not affect opportunities for recreation on state lands.	Develops comprehensive multipurpose outdoor recreation plan to document recreational supply and demand, describe current recreational opportunities, estimate need for additional recreational opportunities, and propose means to meet the identified needs.
Chapter 267 <i>Historical Resources</i>	Cultural resources including archaeological sites and historic structures are located in the vicinity of the Proposed Action. Consultation with the State Historic Preservation Office (SHPO) is currently underway for this project and will be completed prior to project initiation. Identified resources would be managed in compliance with Federal law and Air Force regulations. Should other archaeological sites be inadvertently discovered from ground-disturbing activities, 96th CEG/CEVH, Cultural Resources Branch, would be notified immediately and further ground-disturbing activities would cease in that area.  Therefore, the Proposed Action would be consistent with Florida's statutes and regulations regarding the archaeological and historical resources of the state.	Addresses management and preservation of the state's archaeological and historical resources.
Chapter 288 <i>Commercial Development and Capital Improvements</i>	The Proposed Action would not affect future business opportunities on state lands, or the promotion of tourism in the region.	Provides the framework for promoting and developing the general business, trade, and tourism components of the state economy.
Chapter 334 <i>Transportation Administration</i>	The Proposed Action would not affect transportation.	Addresses the state's policy concerning transportation administration.
Chapter 339 <i>Transportation Finance and Planning</i>	The Proposed Action would not affect the finance and planning needs of the state's transportation system.	Addresses the finance and planning needs of the state's transportation system.
Chapter 370	ALRT activities would require the closure of certain waters during testing, which	Addresses management and protection

<i>Saltwater Fisheries</i>	<p>might interfere with access to certain fishing areas; however, closures would only last for 1-2 weeks and other fishing waters are available nearby. Eglin would issue Notices To Airmen (NOTAMs) and Notice to Mariners (NOTMARs). Therefore, the Proposed Action is not anticipated to result in any significant negative affects to saltwater fisheries.</p> <p>Consultation with the NMFS will be completed in accordance with the Magnuson-Stevens Fisheries Conservation and Management Act on Essential Fish Habitat.</p>	of the state's saltwater fisheries.
<i>Chapter 372 Wildlife</i>	<p>Direct impacts, habitat alteration, and noise impacts during setup and removal activities, and during testing are possible, but the proponent would implement management actions to minimize impacts, such as silt fencing around the beach target areas and the cessation of missions if protected marine species are spotted. The Proposed Action may negatively affect sea turtles, in particular with regard to possible entanglement and deterrence of sea turtles in the structural sea urchins or concertina wire or simulated wire rolls placed in the water.</p> <p>In accordance with Section 7 of the Endangered Species Act (ESA), consultation with the United States Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) would be completed prior to project initiation. Activities proposed in and around threatened and endangered species would be performed in accordance with applicable USFWS and NMFS guidelines. All mitigation measures resulting from the Section 7 consultation would be followed. In addition a letter of concurrence with the NMFS will be requested concerning marine mammals.</p>	Addresses the management of the wildlife resources of the state.
<i>Chapter 373 Water Resources</i>	<p>The Proposed Action is not anticipated to result in any significant negative affects to water resources. Target field setup and removal would cause turbidity; however impacts would be temporary and localized. Target fields would not occur in wetlands or areas that drain into wetlands. Minor digging to bury mines (5-10 cm [2-4 inches]) would occur in the</p>	Addresses the state's policy concerning water resources.

	<p>100-year floodplain, but missions would be infrequent (four per year), of short duration (1-2 weeks) and all holes would be refilled after mine removal.</p> <p>Eglin's Water Resources Section, 96<sup>th</sup> CEG/CEVCE, would coordinate all applicable permits in accordance with the Florida Administrative Code (FAC).</p> <p>Therefore, the Proposed Action would be consistent with Florida's statutes and regulations regarding the water resources of the state.</p>	
Chapter 376 <i>Pollutant Discharge Prevention and Removal</i>	The Proposed Action would not affect the transfer, storage, or transportation of pollutants.	Regulates transfer, storage, and transportation of pollutants, and cleanup of pollutant discharges.
Chapter 377 <i>Energy Resources</i>	The Proposed Action would not affect energy resource production, including oil and gas, and/or the transportation of oil and gas.	Addresses regulation, planning, and development of oil and gas resources of the state.
Chapter 380 <i>Land and Water Management</i>	The Proposed Action would not affect development of state lands with regional (i.e. more than one county) impacts. The Proposed Action would not include changes to coastal infrastructure such as capacity increases of existing coastal infrastructure, or use of state funds for infrastructure planning, designing or construction.	Establishes land and water management policies to guide and coordinate local decisions relating to growth and development.
Chapter 381 <i>Public Health, General Provisions</i>	The Proposed Action would not affect the state's policy concerning the public health system.	Establishes public policy concerning the state's public health system.
Chapter 388 <i>Mosquito Control</i>	The Proposed Action would not affect mosquito control efforts.	Addresses mosquito control effort in the state.
Chapter 403 <i>Environmental Control</i>	<p>The Proposed Action would not impact water resources of the state that are utilized as a drinking water supply or subject to water quality standards.</p> <p>Therefore, the Proposed Action would have no impact on water quality, air quality, pollution control, solid waste management, or other environmental control efforts.</p>	Establishes public policy concerning environmental control in the state.
Chapter 582 <i>Soil and Water Conservation</i>	Major impacts to soils and sediments are not anticipated. Target field setup and removal would cause sediment disturbance; however, impacts would be	Provides for the control and prevention of soil erosion.

	temporary and localized. Therefore, the Proposed Action would not affect soil and water conservation efforts.	
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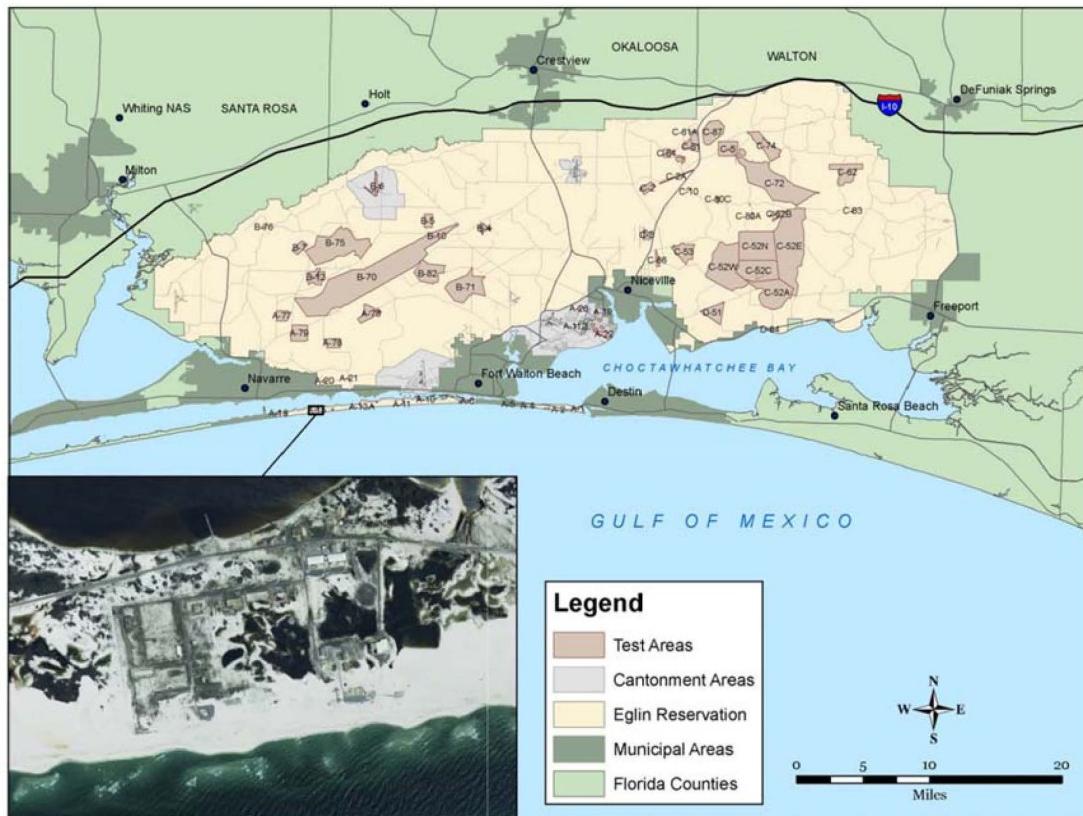


Figure 1. Test Area A-15 on Santa Rosa Island, Eglin AFB

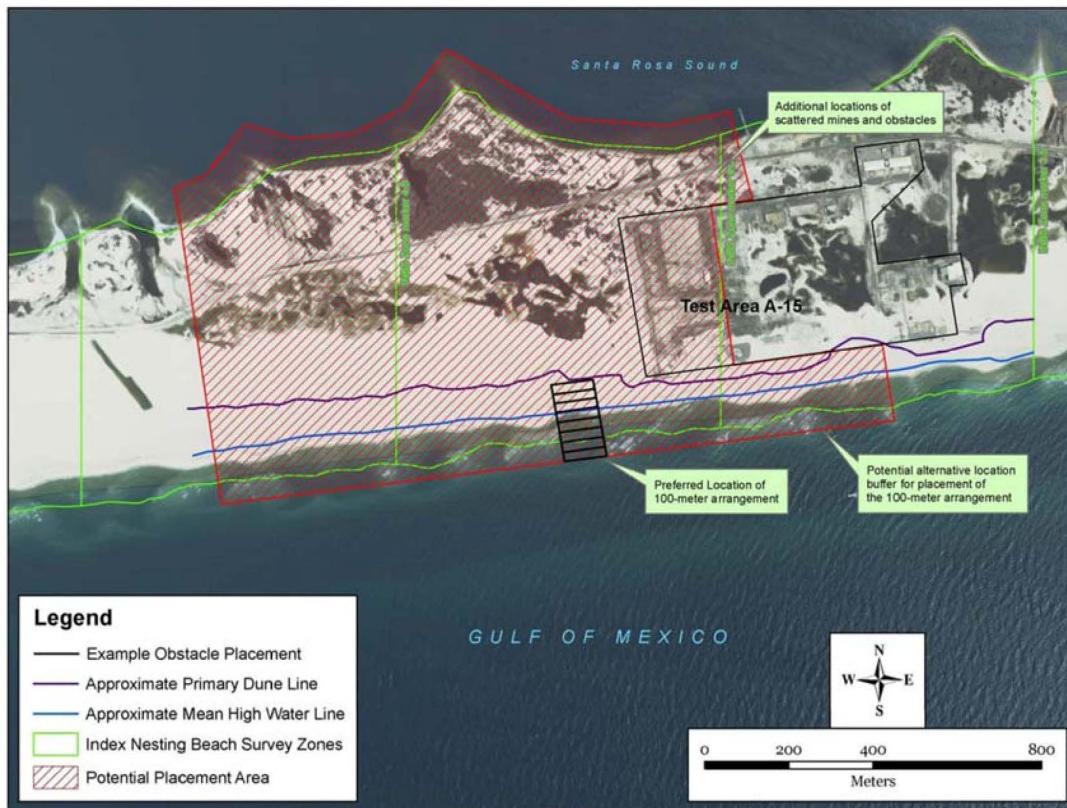


Figure 2. ALRT Target Areas at Test Area A-15

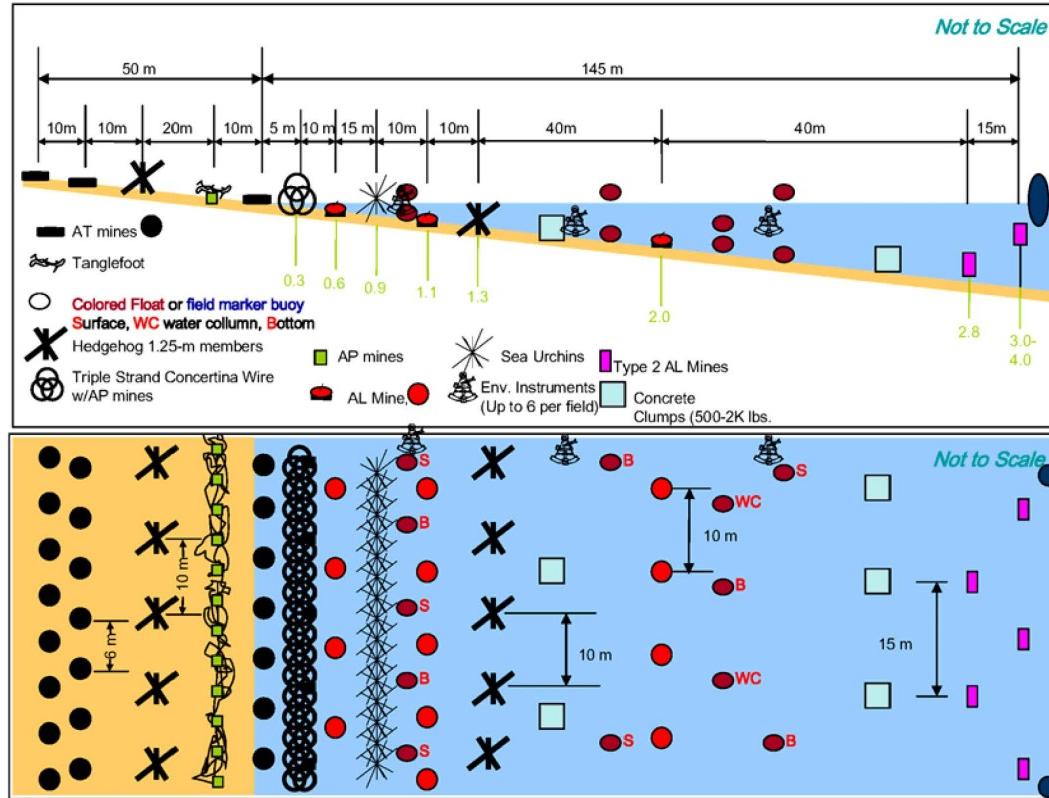


Figure 3. ALRT Target Field Layout



Figure 4. M20 Inert Anti-Tank Mines



Figure 5. PDM-1M Anti-Landing Craft Mines

Figure 6. PDM-2M Inert Mine



Figure 7. Structural hedgehogs



Figure 8. Concertina Wire



**Figure 9. Tanglefoot**



**Figure 10. Structural Sea Urchins Wrapped in Snow Fence**



## Florida Department of Environmental Protection

Marjory Stoneman Douglas Building  
3900 Commonwealth Boulevard  
Tallahassee, Florida 32399-3000

Charlie Crist  
Governor

Jeff Kotkamp  
Lt. Governor

Michael W. Sobe  
Secretary

November 15, 2007

Mr. J. Mike Nunley, Project Manager  
Science Applications International Corporation  
1140 North Eglin Parkway  
Shalimar, FL 32579

RE: Department of the Air Force - Draft Environmental Assessment, Advanced Littoral Reconnaissance Technologies (ALRT) Project at Eglin Air Force Base - Santa Rosa County, Florida.  
SAI # FL200709203772C

Dear Mr. Nunley:

The Florida State Clearinghouse, pursuant to Presidential Executive Order 12372, Gubernatorial Executive Order 95-359, the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended, and the National Environmental Policy Act, 42 U.S.C. §§ 4321, 4331-4335, 4341-4347, as amended, has coordinated a review of the referenced Draft Environmental Assessment (DEA).

Based on the information contained in the DEA and state agency comments, the state has determined that the proposed federal activities are consistent with the Florida Coastal Management Program (FCMP).

Thank you for the opportunity to review the proposed project. Should you have any questions regarding this letter, please contact Ms. Lauren P. Milligan at (850) 245-2170.

Yours sincerely,

Sally B. Mann, Director  
Office of Intergovernmental Programs

SBM/lm

"More Protection, Less Process"  
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